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BULLETIN OF THE HISTORY OF MEDICINE

ORGAN OF THE AMERICAN ASSOCIATION OF THE HISTORY OF MEDICINE AND THE JOHNS HOPKINS INSTITUTE OF THE HISTORY OF MEDICINE

Editor—HENRY E. SIGERIST
Associate Editor—GENEVIEVE MILLER

VOLUME XVII MARCH, 1945 NUMBER 3

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SOME RELATIONS BETWEEN BRITISH AND GERMAN MEDICINE IN THE FIRST HALF OF THE EIGHTEENTH CENTURY

MAX NEUBURGER

During the first half of the eighteenth century, the High School founded in Halle in 1693 stood in the forefront of the German Universities. From there came forth the two most influential medical systems of this period, the teaching system of Friedrich Hoffmann, a combination of mechanical and dynamic theories, and Georg Ernst Stahl's system of animism. Along with Hoffmann and Stahl, the surgeon Lorenz Heister must be included as one of the chief representatives of German medicine in this period.

Friedrich Hoffmann (1660-1742), who had already occupied himself zealously with chemistry as a student under Wedel in Jena and under Cramer in Erfurt, in 1684 made an educational tour to Holland and England. He used this interval for the extension of his knowledge of anatomy, physics and chemistry and made contacts with many scholars. Especially fruitful was Hoffmann's association with Robert Boyle. In this connexion, the biography written by Johann Heinrich Schulze has the following observations:

> Navem deinde conscendit, et mense julio in Britanniam traiecit, ubi per aliquot menses Londini et Oxonii exactos, quicquid in physicis, anatomicis, chymicis vel mechanicis curiosum et utile, avide consideravit, et ex clarissimorum virorum consuetudine fructum non mediocrem percepit. Saepius tunc familiariter cum

illustri domino Roberto *Boyle* versatus fuit, qui non obscure significavit, se virtuti et eruditioni *nostri* magnum pretium statuere, quum ultro saepe ad se accerseret, et de rebus chymicis ac physicis longum colloquium institueret.

Commentarius de vita Domini D. Friderici Hoffmanni. Auctore Jo. Henr. Schultze. Halae Magdeburgicae 1740, pg. 19, 20.

Hoffmann, from the outset of his career, at the instigation of Boyle, turned his attention to the analyses of mineral waters by the wet method. At least as early as 1684 he wrote on the healing springs of Herrnhausen in the principality of Halberstadt.

As a chemist he acquired lasting reputation by his numerous analyses of mineral waters as well as by his investigations on the ethereal oils. He analysed many German springs,[1] coming finally to the conclusion that solid constituents such as lime, magnesia, etc., in the form of an alkali and carbonic acid, existed in almost all mineral springs. He himself examined the waters of Aix-la-Chapelle, Bibra, Carlsbad, Lauchstädt, Pyrmont, Seydlitz, Selters, Schwalbach, Spaa, Teplitz and Wiesbaden.

Hoffmann gave prescriptions for the use of mineral waters, and even taught how they could be made artificially—an idea which Bacon first initiated.

Hoffman had an expert knowledge of English medical literature and set high value on the significance of the contributions of British doctors to the advancement of science. In his chief work *Medicina rationalis systemica* (Halle, 1718-1740) he makes the following remarks on this subject:

Post nobilissimum *Harvaei* sanguinis circuli inventum longe jam facilius est, sanitatis ac mortis causas dare quantum . . . cordis musculosa compages a *Lowero* detecta . . . potentia cordis ac pressione et impulsu liquidorum intelligendo, usum praebuerit, res in propatulo est.

Willisius plurima in morbis chronicis symptomata, mali imprimis hypochondriaci et hysterici, rectissima ex spasmo et nervosi generis afflictione et consensu partium derivavit, postquam nempe structuram cerebri ac nervorum per anatomen accuratius, quam antea investigarat.

Sydenhamius ad curandas variolas omnesque febres acutas, temperatissimum externum regimen, nec non interna temperata, et quae plus sedandi, quam motus excitandi facultate gaudent, repudiatis omnibus calidioribus et alexipharmacis, egregie commendavit. In chronicis vero passionibus sublevandis chinae chinae, lactis, martialium et equitationis usum amplissimum, non sine ratione et experientia nobis proposuit.

---

[1] The mineral waters of England were studied by a number of 17th century physicians, notably by Edmond Deane, Howard Jorden, Nehemiah Grew, Patric Dun, Thomas Guidot and Sir John Floyer.

Medicina rationalis systematica, Tomus Primus, Halle, 1738, Prologomena, cap. V. De incrementis artis medicae promovendis, cap. VI. De medicina eclectica.

He was a careful observer of local epidemics and meteorology, and wrote on such themes as diseases from metals, monoxid poisoning, on personal hygiene, gymnastics, traveling for health, oatmeal cure. . . .

He was one of the first to describe convulsive asthma with dropsy, appendicitis, chlorosis, rubella. He wrote on diseases of the digestive system from apepsia to oesophageal spasm, and on diseases of infants.

According to Hoffmann "debilitas et sensibilitas generis nervosi" and "Acidum praevalens" are to be regarded as the chief causes of diseases of children. Hoffmann described Walter Harris as "that excellent interpreter of infantile diseases," and accepted his views that acid was the chief cause of children's disorders. Harris, a famous follower and protégé of Sydenham, published in 1689 a treatise on acute diseases in infants which held the field until the end of the eighteenth century. It is remarkable for some prevision on the doctrine of acidosis.[2]

In his chapter "De Rachitide" Hoffmann refers to Glisson. He attached much importance to climatic conditions as a factor of rickets. If anything is especially powerful in producing this affection it is a surrounding atmosphere of cold, foggy air full of exhalations of all sorts. A striking evidence of this is seen in the famous emporium of England, London, which is found to be especially apt to produce and foster rickets, not only on account of the moisture given off by the surrounding sea, but also on account of particles given off by coal.[3]

Several of the numerous writings of Hoffmann were translated into English by Robert James, Peter Shaw and William Lewis:

New experiments and observations upon mineral waters, directing their further use for the preservation of health and the cure of diseases, extracted from his several essays upon this subject and illustrated with notes . . . by Peter Shaw, London, 1743.

A dissertation on endemial diseases, or those disorders which arise

[2] "In constituenda causa materiali non parum valet acidum longe multumque praepollens, cui optimus morborum infantilium interpres D. D. Harris, tantum tribuit, ut omnes fere ac singulos affectus, tenerae aetati familiares inde deducere nullus vereatur." (De praecipuis infantum morbis.)

[3] "Luculentum huius rei testimonium exhibet illustre totius Angliae emporium Londinum, quod non tantum propter maris circumfluentis exhalatione sed etiam propter minerales quasdam ex carbonibus fossilibus emissas particulas inprimis rachitidi producendae et sustentandae idoneum deprehenditur." (Medicinae rationalis Systematicae Supplementum, Cap. IX, S. 8.)

from particular climates, situations and methods of living etc., London, 1746.

A treatise on the teeth; their disorders and cure. Transl. from the Latin, London, 1753, 3 edition, Lond., 1756.

A treatise of the extraordinary virtues and effects of asses milk, in the cure of various diseases, particularly the gout, scurvy, and nervous disorders etc., London, 1754.

An essay on the nature and properties of water, shewing its prodigious use, and proving it to be an universal medicine both for preventing and curing the diseases to which the human body is subject, London, 1761.

A treatise on the virtues and uses of whey, London, 1761.

A system of the practice of medicine. From the Latin, by William Lewis. Revised and completed by Andreas Duncan, London, 1783.

Robert James published: *The modern practice of physic, as improved by the celebrated professors, H. Boerhaave and F. Hoffmann. Being a translation of the aphorisms of the former . . . and of such parts of Dr. Hoffmann's works as supply the deficiencies of Boerhaave.* London, 1746.

Robert James, contemporary with the great lexicographer Johnson, was the inventor of the celebrated " fever powders " which bear his name. He was a person of very considerable attainments, and was highly esteemed by Dr. Johnson. He published many works, among them translations of Ramazzini, Prosper Alpinus, Hoffmann and Boerhaave.

Peter Shaw, an eminent physician and voluminous writer in London (d. 1763) was usefully employed in facilitating the study of chemistry in England by his excellent translations of the chemical works of Stahl and of Boerhaave, as well as by his own writings and lectures on that subject.

William Lewis was eminent for his writings on the Pharmacopoeia; his *Experimental History of the Materia Medica* was translated into German (1771). Lewis published translations of Caspar Neumann's chemical works in 1759, and (posthumously) of Hoffmann's *System of the Practice of Medicine*, 1783.

Browne Langrish, physiologist and surgeon of London (d. 1759) was a staunch adherent of Hoffmann's system, and defended his doctrine especially because its author assumed an *ether-like fluid* acting through the nervous system upon the muscles, keeping them in a state of partial tonic contraction and also keeping the humours of the body in the motion

necessary to life. Browne Langrish published in 1733 *A new essay on muscular motion, founded on experiments, observations and Newtonian philosophy.*

Nicolaus Flemyng also was devoted to Hoffmann's doctrine concerning *nervous fluid* and *sympathies* (Consensus organorum) in his work *Neuropathia, sive de morbis hypochondriacis et hystericis* (1741).

In relation to the system of Hoffmann arose William Cullen's Nervous Pathology. According to this system, different from Hoffmann's ether and Stahl's soul, " the nervous force," " nervous activity," " the nervous principle " is the life-giving element, the nerves are the chief agent.

British medicine became a soil for Stahl's Animism, and at times it was combined with iatrophysics or vitalistically transformed by prominent authors. Among them were Cheyne, Farr, Lawrence, Mead, Nicholls, Porterfield, Nicol and Bryan Robinson, Simson, Stuart and Tabor. A special defender of animism was Porterfield, who explained the pupillary reaction as an endeavour of the soul to oppose the action of a strong light stimulus through contraction of the uvea. In his essay concerning the motions of our eyes, he says that the Mind may possibly preside over the vital and natural as well as the animal motions. " Nobody nowadays," wrote Porterfield, " that understands anything of Nature and Philosophy, can so much as imagine that any animal, how abject soever, can be produced by mechanism without active immaterial cause."

In proof of animism repeatedly the instance of Colonel Townsend was mentioned, who shortly before his death was alleged to have stopped his pulse.

Nicholls, as Lumelian lecturer, selected the theme " Anima medica " as subject of his address (1746) and therein he sought to represent the conscious activity of the soul as the driving moment of every physiologic as well as pathologic process.

Robert Whytt wrote with regard to Nicholl's address as follows:

> I have met with no author who has embraced the *Stahlian doctrine* with less reserve or carried it to greater height than a learned physician, in his late elegant Praelection de Anima Medica. According to him, the soul at first forms the body, and governs ever after, carrying on and regulating all its vital and natural motions, distributing the fluids with greater or less force to its several parts and exciting in them from time to time, such commotions and changes as she sees most proper for removing their various disorders. . . . The soul, however, seems to neglect in a great measure this province, as often as she is too much distracted with external things. . . . Though, were she but always wise enough, and, neglecting things of less moment, were she solely intent on the preservation of the body, she could, if we may believe the author, not only prevent diseases, as far at least as they proceed

from internal causes, but protract also the life of man, it may be, to a thousand years. . . . (Robert Whytt, *Works*, Edinb. 1768, pg. 146.)

Cheyne, in his work *The English Malady* stated that a vital principle governs the organism.

Mead, the foremost practitioner in England in the first half of the eighteenth century, stood on the basis of the *Stahlian doctrine*. He identified Nature with vital principle and stressed the unity of the soul, rejecting the differentiations: "Anima rationalis," "Anima brutorum," "Anima vegetativa." Mead wrote as follows: "But this power of the mind is most remarkably perceptible in those fevers which are called pestilential. For in these one may observe that the mind hurries to the assistance of the labouring frame, fights against the enemy and with the aid of the animal spirits, excites new motions in the body (though we may be insensible of it) in order to expel the poison, which is blended with the humours through every outlet. And hence very great physicians have defined a disease to be a struggle of nature in defence of the health of the individual" (*Medical precepts and cautions*, introduction). ". . . and this is done in so sudden a manner that it should seem to be the effect of instinct, rather than voluntary motion" (*A Discourse on the small-pox and measles*, ch. 2).

Tabor, in his *Exercitationes medicae* interpreted all manifestations of life as actions of a soul endowed with instinct.

Stahl's doctrine exerted an influence upon *Robert Whytt*, but he threw it aside. According to his experiments on decapitated animals Whytt ascribed all involuntary motions to the effect of a stimulus acting on an unconscious "sentient principle," residing in the spinal cord.

In therapeutics Georg Ernst Stahl (1660-1734) placed at the head the healing power of Nature. Therapeutics should act upon the "movements" occasioned by nature (soul). If too strong they must be restrained, if too feeble or utterly wanting they must be strengthened or called forth. Stahl made excessive use of venesection, and in addition he gave purgatives and emetics, diaphoretics and especially alteratives, but he discarded many effective drugs, above all the Cinchona bark. Stahl professed to follow the principle of Hippocrates and Sydenham, according to which the duty of the physician frequently consists in careful *expectant observation*, but, on the other hand, of *treatment at the right time* (*Theoria medica vera*, Halle, 1707). In 1730 Stahl edited a Latin translation of Guideon Harvey's *The Art of Curing Diseases by Expectation* (London, 1689).[4]

[4] This work is a collection of random criticism on medical practice with an ironical title.

Sileni Alcibiadis, i. e. ars sanandi, cum expectatione, opposita arti curandi nuda expectatione: satyra Harveana castigatae Offenbach, 1730, Parisus, 1730.

Pt. 2. *Georgii Ernesti Stahl ars sanandi cum expectatione; ubi firmitas, fides, et veritas proborum et peritorum medicorum ostenditur, declaratur et confirmatur.*

Guideon Harvey was a scourge to the physicians of his day, whom he divided into six classes: ferrea, asinaria, jesuitica, aquaria, laniaria and stercoriaria, according as their favourite system of treatment were the administration of iron, asses' milk, cinchona, mineral waters, venesection or purgation. He published also another satirical writing: *The Conclave of Physicians; detecting their intrigues, frauds and plots against their patients.*

Guideon Harvey was a determined opponent of Peruvian bark, and Stahl also denied the utility of Cinchona bark as febrifuge. Fever was for him a salutary effort of nature or the soul to preserve the body. This was true even of intermittent fever and according to him this disease could not be suppressed by the use of Cinchona bark with its astringent properties.

Stahl even went so far as to pretend that dropsy was caused by misuse of Cinchona bark. He quoted a chapter of Martin Lister's excellent work: *Exercitationes medicinales de morbis quibusdam chronicis* (London, 1694, Francofurt, 1696), dealing with the frequent occurrence of dropsy in England. According to Lister the abuse of alcoholic drinks was the chief cause of that disorder, but Stahl contradicted Lister and alleged misuse of Cinchona originating hydrops.

Ubi primo historice notat, quod ab aliquot annorum decadibus observata sit longe maior frequentia hydropis in Anglia, quam Patrum et majorum tempore.

Sicut autem Auctor in hoc negotio minime falsus est subnixus inprimis pulcherrimo instituto Londini usitatorum indicum funebrium, quibus non solum quot homines decesserint sed e quibus etiam morbis, publice declaratur: sed venit etiam merito ungenda huic observationi altera illa omnino sororia, quod non solum longe adhuc plures, quam hydrope, sed etiam plures, quam ullo alio morbi genere, imo longe plures moriantur tabe phthisica atque hectica in eadem Londinense urbe. Huius rei aetiologiam subiicit Auctor, sua sententia esse abusum, enormem a pari propemodum, ut supponit, tempore, spirituum ardentium. Cum autem non modo par, sed et certissime imo notorie longe maior sit spirituum ardentium abusus, non hic illic forte, sed apud nationes totas, Anglica certe nihilo minores, imo potius longe numerosiores hominum multitudine, Polonos atque Russos; neque tamen ibi horum morborum par ad proportionem occurrat proventus, qualem Auctor sua illa hypothesi tanquam directe et simpliciter aut certe eminenter ab hac causa prae aliis deducere sat agit; necesse est proinde falli ipsum in hac sua sententia, et aliam

potius quaerendam esse caussam insolentis huius modi eventus. . . . Corticis chinae abusus potius in caussa est. . . . Efficaciam puto ad huius modi res aeque atque abusum familiarissimum per Angliam corticis Jesuitici, seu Chinae . . . in Anglia quoque harum earundem rerum fabrum existere et architectum hunc corticem tanto minus dubium est, cum notissimum utique sit, quod nemo intemperatius illo abuti audiatur, quam ipsi Angli: sicut etiam publicae illorum commendationes eiusdem hoc palam profitentur (*Theoria medica vera*, Halae, 1737, pg. 899-900).

A follower of Stahl's phlogiston theory was Caspar Neumann (1683-1737), one of the earliest phytochemists and the first scientific apothecary in Germany. At the age of twelve years he entered an apothecary's shop as an apprentice. Subsequently he came to Berlin and attained the position of "Reiseapotheker" of Frederick I. In 1711 the King sent him upon scientific travels through Germany, Holland and England. After the death of his patron, through the influence of the notorious Gundelsheimer Neumann had his discharge handed to him in London. Thus, left without means, Neumann was maintained by a painter until he secured his own livelihood by an engagement in the laboratory of a physician.

Five years later he went with George I to Hanover, and from that place visited Berlin and Stahl, at that time the physician-in-ordinary to Frederick William I. Stahl secured for Neumann again a salary to travel, and with this aid he once more visited England, France and Italy. In 1723 Neumann was appointed professor of practical chemistry in the medico-chirurgical college, and a year later a member of the Obercollegium medicum. Among his numerous works was a treatise on medical chemistry. Neumann discovered Thyme camphor (*Thymol*) in 1719, and made accurate chemical observations on many plants, knew of many vegetable acids and observed their effects not only upon indicators but on alkalis, noting the salts so formed and showing how adulteration of essential oils could be detected by taking specific gravities. Neumann in 1736 published:

De ambra grysea, welche an die konigl. Gros-Brittann. weltberühmte Societät der Wissenschafften geschicket worden. Sammt einem kurtzen Vorbericht solcher Memoire halber, anjetzo, weil wenigen Personen die engländische Transactiones Philosophicae vorkommen, in deutscher Sprache publiciret, von einem Liebhaber der Historia naturalis.

The chemical works of Neumann appeared in English translations: *The chemical works of Caspar Neumann abridged and methodized* by William Lewis, London, 1759, 2nd Edition, London, 1773.

Lorenz Heister (1683-1758) was the first German surgeon of complete scientific education. After laying the foundation of his education in Giessen, he completed his proper medical studies in Leyden and Amster-

dam. As it was impossible to obtain honourable employment in the German armies, it was only in the Dutch military service that he could acquire surgical experience with a respectable position. He remained in this service until it was learned, by experience both at home and abroad, that there might be good German surgeons as well as French, who, up to this time had been much sought after.

In 1710 Heister was called to Altdorf and in 1720, he came to Helmstädt, where he developed great activity which embraced anatomy and surgery, and even botany.

In the preface to his chief work Heister's autobiographic notes read as follows: " In the beginning of the spring following 1710, I was, beyond all expectation, called by the Republic of Norimberg to teach anatomy and surgery, as public Professor in the University of Altdorf. Being therefore unwilling to neglect this honourable invitation, having obtained leave from the Republic, I first made a tour into Great Britain where I was, from spring to autumn, collecting everything new in the several branches of Physic, and then, returning to Norimberg and Altdorf, I assumed my new Professorship.

" In 1719 I received a most gracious call to the publick Professorship of Anatomy and Surgery in the Julian University of *Helmstadt from his Britannic Majesty, as Duke of Brunswick and Lunenburg*, under whom the University flourishes, and is liberally supported."

Heister discussed surgery from the ordinary dressing of wounds, upon which he laid especial weight and ligation (acupressure), to the highest surgical subjects. He also distinguished himself as a dentist and especially as an oculist, assisting to introduce into Germany the view that cataract depended upon cloudiness of the lens.

Heister, who, like most surgeons of the time, was an excellent anatomist, had an important influence in raising the standards of surgical teaching in Germany. His *Chirurgie* (1718) was one of the first systematic treatises on the subject and is especially interesting for its illustrations.

Heister's *Chirurgie* appeared in English translation (from the Latin) under the title *General System of Surgery*, in three parts, London, 1743, 1745, 1748, 1750, 1752, 1753, 1757, 1759, 1763, 1768. Heister's *Compendium Anatomicum* appeared in English translation twice: *A Compendium of Anatomy*, London, 1721, and *A Compendium of Anatomy*, to which are added notes by M. Henault and the Editor, London, 1752. A new edition in Latin was published in Edinburgh, 1777.

The following works also appeared in English translation from the

Latin: *Compendium of the Practice of Physic*, translated by Edmund Barker, London, 1757, and *Medical, Chirurgical and Anatomical Cases and Observations*, translated by George Wirgman, London, 1755.

When introducing the English translation of the sixth edition of the *General System of Surgery* the Editor wrote in his preface:

> The translation of the book, which now appears in the world, will obtain a complaint, frequently made among the junior surgeons and pupils of this art in *England*, viz., that they are in want of a general system, capable of instructing at large one, that is a Learner in Surgery, for the execution of all the branches of his profession and this, till now, might indeed be affirmed with some justice. It is true, the several branches of surgery have been tolerably well handled by various authors at different times, and in separate treatises . . . but in no one book, except the present, do we meet with all these branches treated in that ample, easy, and intelligent manner, which is necessary for the first information of beginners, or the occasional consultations of the more advanced.
>
> We have in this work, not only the best and most modern methods of practice used by the principal surgeons of the skilfullest *European* Nations, but also exact figures of their several instruments and bandages, with the method of using or applying them in all chirurgical cases whatever. The whole doctrine of which is here explained in the minutest circumstances, and brought down even to the lowest capacities.
>
> The translator's preface.
>
> Lond., Oct., 1742.

The Editor in the preface to the eight edition (London, 1768) wrote the following introductory remark:

> This most excellent and elaborate work is so well known in the learned world and has everywhere met with so favourable a reception that to detain the reader at present with any encomiums on this subject would be vain and superfluous.

Heister's work *A System of Surgery* also held the field in Great Britain until the appearance of Benjamin Bell's *A System of Surgery*, Edinburgh, 1785. And it was Benjamin Bell who praised Heister as a predecessor. He wrote in the preface to his work:

> The learned and judicious Heister published the last edition of his System of Surgery so long ago as the year 1739. In this work the author comprehends whatever the experience of former times had approved as useful, and adds such observations as his own knowledge in anatomy and practice in surgery suggested. This was the first, and it still remains the only complete system of surgery of which we are possessed.

The ancients believed that some morbid humour flowing down within the eye in a space behind the iris, caused the obscuration of the sight.

This idea prevailed throughout the Middle Ages and well on towards the end of the seventeenth century despite the announcement by Fabricius in 1600 that the lens rested immediately at the back of the iris. In the early part of the eighteenth century, however, the scientific world was led to the fact that true cataract is a clouding and hardening of the lens. Brisseau, by his experiments on the cataractous lens of a dead soldier, learned the true nature of cataract and its proper position within the eye; also that the substance depressed in the operation of "couching" was not a "humour" from in front of the lens, but actually the lens itself. In 1705-6, he wrote a treatise on the subject which was read at the Académie Royale des Sciences of Paris by Dodart, because Brisseau was not an ophthalmologist nor even a surgeon but only a physician. In 1708 Brisseau reclined or couched the lens of a living subject, and in that year dissected four dead eyes; through these investigations he confirmed his discovery of 1705.

Antoine Maitre-Jean (Maitre-Jan) disputes with Pierre Brisseau the honour of first recognizing the true seat of gray cataract in the lens, 1705.

Heister agreed with Brisseau, defended his important discovery, and published the result of his own studies in his *Tractatio de cataracta glaucomate et amaurosi*, Altdorf 1713; 1720.

He earned deserved approbation by the most famous anatomists and surgeons of the time. But the English ophthalmologist J. T. Woolhouse [8] who lived at that time in Paris, directed offensive pamphlets against Heister's correct teaching that the seat of cataract is the crystalline lens:

Dissertationes ophthalmicae de cataracta et glaucomate . . . e Gallicae in Latinam Linguam translatae, Frankfort-on-the-Main, 1719.

Dissertationes ophthalmicae de cataracta et glaucomate contra systema Brissaei, Antonii, Heisteri et aliorum, Frankf. a. M., 1719.

"Mém. communiqué sur la quantité d'humeur aqueuse contenue dans chacune des deux chambres comprises entre la cornée et la cristalline" (*Journ. des savants*, 1720).

Heister responded to his opponent in his publications *Apologia et uberior illustratio systematis sui de cataracta, glaucomate* . . . Altdorfi 1717, and *Vindiciae sententiae suae de cataracta*, Altdorfi 1719.

[8] John Thomas Woolhouse, born about 1650, travelled throughout Europe to make himself familiar with the various methods of treating diseases of the eye, and thus became known to the principal men of the age. James II appointed him as oculist. In 1711 he was living at the Hôtel Notre-Dame, Rue St. Benoist, Paris; he served as surgeon to the Hospice des Quinze-Vingts. In Paris he is said to have had a large practice. He returned to England later in his life and died there on January 15, 1733-34.

In the chapter dealing with cataract operation he mentioned William Cheselden's invention and performance of iridectomy (1728). Heister's son, Elias Friedrich Heister wrote against John Taylor *Besondere Nachricht wegen des im Frühjahr 1735 in Holland so sehr gerühmten Englischen Oculisten D. Taylor's u. s. w.*, Helmstädt, 1736.

It was Heister also through whom the discovery of the forceps became known in Germany. In the third edition of his *Chirurgie* (1736) he mentions that *one "Zangenlöffel,"* or "hook" (*Haaken*) as he called the instrument, had been sent him and that he had made an improvement on it, but that he did not wish to express an opinion on the value of the instrument until he had made definite tests with it. The next reference to the forceps on the part of German doctors was made by Philipp August Böhmer in an appendix to a translation, prepared by him, of the *Artis obstetriciae compendium* (1746) of Richard Manningham. Böhmer was the first to use the name "forceps" and actually "*forceps anglicanus*" for the instrument.

In the English translation of the last edition of Heister's *Chirurgie* we find the following passage concerning Palfyn's hooks:

> But as I found by experience that those were insufficient, especially where the head was very closely locked in; nor did they retain it firmly on account of its lubricity. I therefore judged it expedient to contrive some method of joining the hooks together to give them a greater force. Hereupon many surgeons were set to work to improve the instrument; and connected the hooks by means of a ligament, or by a hinge in the form of a forceps: by which they extracted not only dead, but the living foetus with success, though strongly wedged in by the head; as *Chapman*, *Giffard* and *Boehmer* testify in their writings on the practice of midwifery.
>
> But when the foetus is known to be certainly dead, I prefer my common hooks to the *English* Forceps; for the forceps are so large that they strike a great terror not only into the poor patient but the standers by, whereas my hooks are so small that they may be easily concealed." (*A General System of Surgery*, translated from the author's last edition, vol. 2, Sect. 5, chapter 142, London, 1768.)

Plate 33, Fig. 16 represents Palfyn's instrument: a kind of flat hook without any edge by means of which the compressed head of the foetus might be easier extracted without lacerating or wounding.

THE EARLY HISTORY OF GOITER IN THE AMERICAS, IN NEW ZEALAND, AND IN ENGLAND

A Contribution to the Etiology of the Disease

ISIDOR GREENWALD *

The success of the use of iodides in the prophylaxis of endemic goiter has tended to obscure, in the minds of many, the numerous observations that indicate that lack of iodine is not the sole cause of goiter. Of these, only those that are germane to the subject of the present paper will be considered. There are many others.[1] Nor will any attempt be made here to discuss the validity of the claim that the incidence of goiter in a population is in inverse relation to the concentration of iodine in the food or water or both.

It may be well to recall that Marine, whose investigations were chiefly responsible for the recent revival of the prophylactic use of iodine, did not claim that lack of iodine was the sole cause of goiter. Marine and Lenhart (3) wrote (p. 479):

> But whatever the ultimate causal factor is shown to be, it is certain that there is a deficiency of iodin in the gland, and that this deficiency of iodin in the gland is not usually due to a lack of iodin intake, but is dependent on a lack of absorption or assimilation of iodin. And it is our belief that one or more chemical substances will be found which are antagonistic to or inhibit the normal absorption or assimilation of iodin.

The present paper is a review of the evidence relating to the early history of goiter in the Americas, in New Zealand, and in England. It will be shown that there is no evidence that goiter existed in the Americas,[2, 3] or in New Zealand before the coming of the white men, and

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[1] The earlier literature is reviewed by Hirsch (1). Some of the more recent reports are to be found in the *Proceedings of the Second International Goiter Congress*, Berne, 1933. A later review is given by Wolter (2).

[2] In his monograph, Stone (4) states (p. 26): "In certain areas, goiters and urinary calculi were endemic as they are today in these regions among both their white and red inhabitants." Inquiry as to the sources for this statement elicited the reply: "Goiter was not noticed by the early-day explorers or pioneers" (5).

[3] In his book, Moll (6) (p. 504), says of goiter: "Prevalent in America since pre-Columbian days, as Valdizan pointed out for Peru and shown by Tarascan figures in Mexico"; A request for specific reference to the statement by Valdizan, who published between 1922 and 1925, and to where Tarascan figures showing goiter may be found met with no reply to the first, and with the statement—"Tarascan figures (showing goiter?

in most regions, for many years thereafter. Many other diseases were observed and reported by early explorers and travellers. The fact that goiter, so easily observed, particularly among those who did not cover the neck, was not reported by any of them must be regarded as evidence that it did not exist. In addition, certain definite statements as to its absence are also to be found. It will also be shown that, at various times, goiter became extremely prevalent and marked in districts in which it later became comparatively rare.[4] Many of the sites of its originally high incidence are quite close to the sea, both horizontally and vertically.

It will be shown that there is definite evidence that goiter was unknown in England about 1600, that the earliest clear indication of its existence in England dates from 1743 and that writers of an earlier period referred to the disorder exclusively as a remarkable condition prevalent in Switzerland, Piedmont, and Styria.

The significance of these facts will be discussed briefly.

America, North of Mexico

The earliest paper by a physician dealing with diseases of the Indians appears to be that by Benjamin Rush in 1774 (8). In that, there is no mention of goiter. This disorder is first described as occurring among Indians by Barton (9).[5] This he observed among the Oneida Indians in western New York in 1797 and shortly thereafter in the Ohio Valley and along the shores of Lake Erie. Barton mentions others who had seen goiters (amongst whites, not Indians) in various parts of North America. Most interesting, in view of later conditions, is the report of the prevalence of goiter among the whites in the Mohawk Valley. This had

I. G.) are to be found in Mexican museums. Dr. Leon, the well-known medical historian, had a number of them in his collection, unfortunately scattered after his death. I realize only too well that in every interpretation of signs in such figures, as well as in huacos, full allowance must be made for the interpreter's possible bias or eagerness to find confirmatory results, and also for the factor of human fallability, which on such *shaky ground* (italics, I. G.) may tilt decisively the scales in the wrong direction" (7). The evidence regarding the occurrence of goiter in Mexico and in Peru will be considered in the appropriate sections of this paper.

[4] Only some of those changes that occurred in the Americas will be considered. There were many other similar changes in Europe, as described in Hirsch (1) and by others, see Wolter (2).

[5] Considerable space will be devoted to a consideration of Barton's statements because they have been quoted by many subsequent writers, even so recently as 1933, by Harington (10). It will be shown that some of them are based upon the untrustworthy or erroneous reports of others.

been observed by Coventry (11) in 1792, particularly among those of German or Swiss descent.

The date at which Barton first saw goiter amongst Indians is nearly two hundred years after the coming of white men. During that time, many explorers, missionaries and other pioneers had visited the Great Lakes section of North America, had spent considerable time living with the Indians, and had written descriptions of their physical characteristics, of their mode of life, of their diseases, and of their methods of treating these.

The present writer makes no pretense to having read all of these reports. He has, however, examined a large number of them, has consulted the indices of all publications available that have been indexed, and has searched, page by page, the relevant portions of many other accounts that are provided only with a table of contents. Of these, only the more important, containing the more significant material, will be mentioned here.

The Champlain Society of Toronto has published or, rather, republished, in the original and in English translation, the journals and writings of several of the early explorers of the St. Lawrence Valley, the Great Lakes and the regions west of these. Among the more important of these, for our present purpose, is the *Long Journey to the Country of the Hurons* by Sagard-Theodat (12). He spent the winter of 1623-4 with the Hurons. In his account there are seventeen chapters, 126 pages, dealing with their physical characteristics and their mode of life from birth to burial. There is no mention of goiter. The Huron Indians lived in the peninsula of Ontario, now a well-known goiter district.

One of the lieutenants of La Salle, Hennepin, left a detailed account of his explorations. He ascended the Mississippi from the mouth of the Ohio to the falls of St. Anthony in Minnesota. He came to Canada in 1675 and returned to France in 1682. His *New Discovery* contains more than eighty pages descriptive of the Indlans, describing their customs of adoption, feasting, games, their remedies, etc.; but there is no mention of goiter. He wrote (13) (p. 477):

"They are clear-limb'd, active and robust. I never saw any blind, crooked or deformed person among them." and (14) (p. 144), "The fact that the Indians are without bodily defects. . . ."

The great source of information regarding the early days of Canada is *The Jesuit Relations and Allied Documents*. These contain the annual reports of the Jesuit missionaries to the Provincial of the Order in France.

They have been edited by Reuben Gold Thwaites (15) and published, in the original French or Italian, with English translations, in 69 volumes and two volumes of indices. The latter contain hundreds of references to the life of the Indians from the Atlantic to Lake Superior and the Mississippi River and south to western New York. There is but one reference to goiter. That occurs in the *Breve Relatione* of Bressionis of 1653. Writing of the Hurons, he states (Vol. 38, p. 257):

> They are not very dark, especially in their youth; they are strong, tall in stature, and well-proportioned; more healthy than we, not even knowing the names of many diseases common in Europe such as the stone, gout, rupture, etc. They are not found either hunch-backed nor dwarfed or very corpulent, or with goiter.

There are five references to scrofula in these accounts. They are really scrofula, not goiter, for everyone mentions the discharge and the foul odor.

Aside from these Jesuit Relations, there are many other published accounts giving in considerable detail information regarding the Indians from the Great Lakes to the Rocky Mountains. The information regarding the Indians of the western Great Lakes contained in these accounts has been incorporated by Kinietz (16) in his book. There is no mention of goiter in this volume nor in the original sources that have been examined.

Of the Indians living further to the west, on the upper Missouri, we have the testimony of Perrin du Lac (17), page 79:

> The savages are, in general, tall, and well made. . . . Dropsies, apoplexies, palsies, gout, asthma, consumption, stone, etc. are unknown.

That this early freedom from goiter was not due to any racial immunity of the Indians is evident from the fact that in 1895, nearly all the Indian agency physicians reported to Munson (18) that the disease was more frequent among full-blooded Indians than among whites or among half-breeds.

Shortly after the purchase of Louisiana, Jefferson commissioned Capt. Meriwether Lewis to explore some of this new possession of the United States. In his instructions to Capt. Lewis, Jefferson enjoined him to record the names, number and characteristics of the Indian tribes, including " the diseases prevalent among them and the remedies they use " (19) (Vol. 7, p. 248).

Several members of the expedition kept diaries. In the *Journal* of Capt. Lewis, we may read (20) (p. 44):

> . . . was here (Ohio River, a short distance below Marietta, I. G.) informed that there were some instances of the goitre in the neighborhood two women who

lived on the bank of the river just below they had emegrated to that place from the lower part of Pennsylvania and had contracted the disease since there residence on the Ohio.

This passage is quoted only to show that at least the leader of the expedition recognized goiter and believed it to be of sufficient importance to mention it in his diary, even in that part concerned with his voyage through territory belonging to the United States since 1783. There are references to other diseases, mostly venereal, in these diaries, but there is no other reference to goiter in any of them (19) (20) (21). There is one reference to tumors (19) (Vol. 3, p. 186).

The nativs of the waters of the Columbia appear helthy. Some have tumers on different parts of their bodies.

At the time of the Lewis and Clark expedition, Tabeau was living among the Arikara Indians on the upper Missouri River. He left us a rather detailed description of the various tribes, of their physical characteristics, mode of life, etc. Of the climate of the upper Missouri, he wrote (22), page 151:

. . . if the winter were a little less rigorous, (the climate, I. G.) would be, methinks, one of most beautiful in the world. . . . Consequently, inflammation of the lungs, ague, jaundice and other maladies are here absolutely unknown. Strangers, like the natives of this region, enjoy perfect health and I believe that, were it not for accidental illnesses and especially the venereal diseases, one would be ill only to die.

The territories to the east and to the south of those explored by Lewis and Clark were visited by Major Z. M. Pike. His first expedition to the headwaters of the Mississippi was made in 1805 and 1806; his second to the west and southwest and into Mexico in 1807. There is no mention of goiter in his journals of these expeditions (23).

A few years later, there was another exploration of the southwest under the command of Major S. H. Long. The route was up the Platte River to the Rocky Mountains, returning by the Arkansas River. This journey did not pass through what is now recognized as a region of very high incidence of goiter. Nevertheless, in 1895, Munson (18) reported an incidence of 20 per 1000 among the Santee Sioux in northwestern Nebraska and of 30 per 1000 among the Utes in southern Colorado, and in 1908, Hrdlicka (24) reported 3 cases in 300 children at the Genoa school, near the Platte River, in eastern Nebraska. It is, therefore, interesting to read in the account of the Long expedition by the botanist and geologist thereof (25) (Vol. 1, p. 239):

Goitures and wens are not known [among the Omaha Indians I. G.].

A few years later, there was a similar expedition to the north through much the same country as that visited by Pike on his first expedition eighteen years earlier. Keating (26) mentioned a number of diseases that were observed among the Indians. Goiter was not among them.

Belonging to the same period, is the account by Schoolcraft (27) of his voyage from Detroit to the headwaters of the Mississippi. He devoted considerable space to an account of the various Indian tribes, but there does not appear to be any mention of goiter.

Beltrami (28) (29) was another visitor to the sources of the Mississippi. He also described the physical characteristics of the Indians, but did not mention seeing any goiters.

In addition to these reports, we have a series of *Early Western Travels, 1749-1846*, edited by R. G. Thwaites and published in thirty volumes and two volumes of indices (30).

Under the entry "diseases," there are about 325 references. Under the word "tumor" we find a reference to a description of what was unquestionably goiter, observed near Pittsburgh in 1803 (Vol. 3, p. 346). There is one reference to goiter. That occurs in the *Travels into the Interior of North America* by Maximilian of Wied (1832-4). Writing of the Mandan Indians, he states (Vol. 23, p. 257):

> . . . some goiters, or rather thick necks, among the women are caused by too great exertion in carrying burdens on their backs.

Whether the "thick necks" were goiters or not we cannot say, but the time was a hundred years after the country had first been visited by Pierre de la Verendrye (31). In the interval, many other white men had come and gone, and there had been many changes in the life of the Indians. David Thompson (32, 33), who had a keen eye for natural phenomena, spent twelve days among the Mandans in 1798 and did not record the presence of goiter or of thick necks. Moreover, we have the positive statements of Perrin du Lac (17) and of Tabeau (22) that the Indians were of good physique in 1803.

In this collection of *Early Western Travels*, there is but one reference to scrofula (Vol. 16, p. 132) and then it is mentioned merely as a disease that may be expected "if ever Western Louisiana is peopled."

For eight years, 1832-39, George Catlin (34) lived among the Indians in various parts of the United States; for much of that time in districts in which goiter is, or recently was, endemic. His purpose was to depict the Indians and their customs not only in words, but by drawing and painting. The Oneida Indians (see page 230) are mentioned, but were

not visited because their mode of life had been too greatly influenced by their prolonged contact with white men. He spent considerable time with the Mandan Indians and devoted more than a hundred large pages to a description of their physique, their mode of life and their beliefs. Neither in these hundred pages nor in any other part of the two volumes is there any reference to goiter.

In this period (1820), we find a reference to the occurrence of goiter in western North America which has repeatedly been cited as evidence of the worldwide distribution of goiter. This occurs in Sir John Franklin's *Narrative of a Voyage to the Shores of the Polar Sea* (35), p. 118.

> The following remarks on a well-known disease are extracted from Dr. Richardson's journal. " Bronchocele or goiter is a common disease at Edmonton. I examined several . . . endeavored to obtain information regarding it from the most authentic sources. . . . The disorder attacks only those who drink the water of the river. It is indeed in its worst state, confined almost entirely to the half-breed women and children who reside constantly at the fort and make use of river water. . . . The men . . . on journeys . . . when their drink is melted snow are less affected; and, if any exhibit during the winter some incipient signs of the complaint, the annual summer voyage to the seacoast generally effects a cure. The natives who confine themselves to snow water in the winter and drink of the small rivulets which flow through the plains in summer, are exempt from the attacks of the disease. . . .
>
> A residence of a single year at Edmonton is sufficient to render a family bronchocelous. Many of the goiters acquire a great size. Burnt sponge has been tried and found to remove the disease, but an exposure to the same cause immediately reproduces it.
>
> A great portion of the children of the women who have goiter are born idiots with large heads and the other distinguishing mark of cretins."

The disease was reported to Richardson as also existing on the head waters of the Peace and Elk (now Athabasca) Rivers, northwest of Edmonton. It is explicitly stated (p. 119) that the disease was not known at Carlton House, about 300 miles to the east, down the North Saskatchewan, from Edmonton, although river water was used. This was an observation that Richardson made himself, for he spent considerable time there.

This very explicit account of the occurrence of goiter and cretinism is interesting because of its geographic and temporal isolation. There is no record of goiter at that time within at least a thousand miles of Edmonton. The fort, as the trading posts were known, was built in 1794 or 1795 (36), some 20 miles down the river from the site of Edmonton. This was destroyed by the Indians in 1807 and rebuilt in 1808 on the present site of Edmonton. The earliest visit of a white man to the Saskatchewan

in the immediate vicinity was probably that of Peter Pangman in 1789 (37), but he left no records. In 1754, Anthony Hendry had probably come within about 150 miles of Edmonton (38). There is no mention of goiter in his journal. David Thompson and Alexander Henry (32) (33) visited the vicinity of Edmonton at various times between 1799 and 1809. Neither mentioned goiter among the Indians.

Alexander Mackenzie (39) travelled extensively in the section watered by the Athabasca and Peace Rivers after 1787; and in 1792-3, he crossed the Rocky Mountains from the headwaters of the Peace River to those of the Fraser. He mentioned a Mr. Pond (Vol. 1, p. 349), who settled on the bank of the Athabasca River in 1787 and remained there three years; but nowhere in his book is there any mention of goiter.

David Harmon (40) travelled a great deal in the same region between 1800 and 1810, traversing it again in 1819, after having spent the intervening years on the west side of the Rocky Mountains. There is no mention of goiter in his *Journal* nor in the sixty-eight pages devoted to an " Account of the Indians on the East Side of the Rocky Mountains."

The account given by Franklin is, therefore, the earliest report of the existence of goiter in this region. Thereafter, it was reported regularly, in a territory of ever-increasing size, but apparently in lesser severity.

In 1841, Sir George Simpson (41), head of the Hudson's Bay Company, travelled along the Saskatchewan River. While on the Bow or South Saskatchewan River, but apparently referring to both branches of the Saskatchewan, he wrote (Vol. 1, p. 118):

> . . . the water, like that of the Alps, was known to give the goitre, even as far down as the forks of the two great branches of the Saskatchewan, to such as might habitually and permanently use it.

It is interesting to note that Simpson states that the disease prevailed as far east as the forks of the Saskatchewan. This is well below Carlton House, where, according to Richardson, it was absent in 1819.

A few years after George Simpson, P. J. de Smet (42) passed through Edmonton on his way to the Pacific coast. At Edmonton, he wrote (p. 183):

> In this climate, wens are not infrequent.

It is noteworthy that although de Smet travelled over great areas in the northwestern United States and western Canada, this is the only reference to the occurrence of goiter.

There was a very thorough exploration of the district from 1857 to

1860 under the command of Capt. Palliser. The geologist was James Hector, a physician. At Edmonton, under date of February 6, 1858, he wrote (43) (p. 78):

> Goitre is very prevalent among the residents here and at the Rocky Mountain House, (100 miles southwest, I. G.), but in a modified form, and I have seen only one case in which there is any approach to cretinism. I tabulated the details of 50 or 60 cases, but have not discovered any one condition or habit of life that is common to all that suffer from the complaint. The only curious feature seems to be that children born at one fort are never attacked till removed to the other, and it again disappears on their return to their native place.

This effect of removal from one place to another, each site being goitrogenic for children born at the other, appears to be unique in reports concerning goiter. For this observation, Hector was, in all probability, dependent upon others. However, our immediate interest is in an observation that was his own, viz.: the rarity of cretinism. When his is compared with Richardson's account, it is apparent that there had been a marked change in forty years.

Shortly after the Palliser expedition had completed its explorations, Viscount Milton and W. B. Cheadle travelled across Canada. They may truly be said to have been the first tourists to visit the prairie provinces and the Canadian Rockies. Their experiences are recounted in the book they wrote (44) and in the journal kept by Cheadle (45). They spent the winter of 1862-3 near Carlton House, which they reached on September 28. Under date of October 8, Cheadle wrote:

> Goitre frequent amongst dwellers on banks of Saskatchewan: limestone and carbonate of lime plentiful.

They were at Edmonton from May 14th to June 3. Cheadle's journal contains no further references to goiter, but in their joint book, Milton and Cheadle wrote, of the girls of Edmonton (44), p. 69:

> . . . some of the young girls were good looking, but many of them were disfigured by goitre, which is very prevalent among the half breeds at all posts on the Saskatchewan, although unknown among the Indians.

From Edmonton, they proceeded to the headwaters of the Athabasca River and crossed the Rockies to the Fraser River. They made no mention of goiter on the Athabasca River, as reported by Richardson forty years earlier.

That goiter was not particularly prevalent among the Indians may also be concluded from the observations of Paul Kane. He attempted for the Indians of Canada what Catlin tried to do for those of the United

States, viz., to prepare a record, in word and picture, of their physical characteristic and mode of life. He was in and around Edmonton on three occasions in 1846, 1847 and 1848. He mentions the beauty of some of the Indian women, but neither in his book (46) nor in the pictures that have been published (47), has any indication of the existence of goiter been found.

Cheadle's is the latest reference to goiter in Alberta for a long time. In 1919, there was a considerable discussion of the prevalence of the disease in the vicinity of Calgary (48) and later surveys (49) (50) (51) indicate that the disease is now fairly widespread not only in Alberta, but in Saskatchewan and Manitoba (52) (53) as well. However, in 1919, T. H. Whitelaw (54), after a residence of nineteen years in Edmonton, the first ten years in general practice, later as medical officer, wrote:

> I am personally acquainted with a great many "old timers" and their families who were here when I came here nineteen years ago, and I cannot say that I recollect seeing a single case among them.

It is, therefore, evident that the history of goiter in and about Edmonton resembles that of newly introduced epidemic diseases, which, after a period of high incidence and great severity become endemic, but with lowered incidence and lessened severity with occasional increases in both.

In marked contrast to the conditions reported by Hector, a member of Palliser's party exploring a route for a Canadian Pacific railroad, are those reported by Suckley, a physician attached to a party exploring a route for a Pacific railroad through the northern United States, at about the same time. No mention of goiter has been found in Suckley's report, which includes the following paragraphs regarding the diseases of the Indians (55), page 124:

> All the Indian tribes which came under my observation east of the Rocky Mountains seemed free from epidemic disease, at least temporarily free. Their principal complaints are chronic inflammation of eye and phthisis pulmonalis. Lues venerea and gonorrhea prevail, to a certain extent among the Assiniboines and Gros Ventres; but the Blackfoot proper, Piegans and Blood Indians, as far as I could learn, are nearly exempt from these diseases.
>
> The Indians seen between the Rocky Mountains and Fort Colville belong to the Flathead and Pend d'Oreille or Kalispelm tribes. Owing to the good principles inculcated by the missionaries, they are very virtuous in their habits: consequently, syphilis is almost unknown among them. Phthisis pulmonalis is very common among them, especially among the last-mentioned tribes. They are very poor and frequently suffer from scanty innutritious diet. As most of the members of both of these tribes have been vaccinated by the missionaries, small pox is of rare occurrence.

It is scarcely conceivable that goiter, if endemic at that time, would not have been reported by Suckley. Today, the region traversed by the expedition and inhabited by the Indian tribes mentioned is included in the great goiter areas of the United States.

The various surveys, explorations and accounts of travellers in the more southerly portions of the western United States fail to disclose any mention of goiter to at least as late as 1860. In the following year, Burton wrote, of the inhabitants of Utah (56), page 337:

> It is also remarkable that though all drink snow water, and though many live in valleys where there is no free circulation of air, goitre and cretinism are not yet named.

Returning to the eastern United States, we find that the presence of goiter in the first decade of the nineteenth century is evidenced not only by Barton, but by others. In 1804, Timothy Dwight, President of Yale College (57) wrote of a journey made by United States Senator Uriah Tracy. Beginning in 1800:[6]

> . . . he passed through Pennsylvania by the way of Pittsburgh and Presque Isle and thence crossing Lake Erie, proceeded to Detroit. From this place, he went to Michilimackinac and thence to Lake Superior. From Michilimackinac, he returned to Buffaloe creak, and took the great western road to Albany. In this excursion, he found the goitre existing in the older settlements more, and in the newer, less frequently, but actually existing at different distances throughout the whole region. Several other gentlemen have confirmed the account of Mr. Tracy. That the disease exists from Utica to Buffaloe, is, I think, certain; probably not in every township; but in such a manner as to indicate that it is incident to the country at large, and has a foundation in its nature and circumstances. (Vol. 4, p. 116)

Dwight, himself, saw several cases of goiter in the Mohawk Valley. The prevalence of the disease is attested to not only by Barton and by Dwight, but also by Coventry (8), later president of the Medical Society of the State of New York. The latter saw several cases near Utica in 1792. In 1798, he settled near a goiter family. A few months later, his wife and daughters developed goiters; a year or two later, a twelve-year old boy living nearby developed the disease, and, in 1802, a flock of sheep became goitrous. After discontinuing the use of the brook that ran by the property of the goiter family and after this family moved away, Coventry's family and sheep had no further trouble. However, the relief was much more general, for in 1824 he wrote of Utica:

> . . . if there is a single case of goitre among the population of 4,000 souls, it is unknown to me.

---

[6] The date is not given by Dwight, but has been obtained from Gibbs (58).

The same testimony is given by John W. Francis, who visited the region in 1823. In a letter to Hosack (59) he wrote:

> However frequent cases of goiter may formerly have been in the State of New York, the fact is certain that they are much less frequent at the present time. . . . In the village of Utica, which contains between four and five M inhabitants, not a case of bronchocele could be pointed out and this village, you know, occupies the site of old Fort Schuyler on the Mohawk, the vicinity of which place so many writers have referred to as the especial spot for the prevalence of the complaint. . . . A similar remark may be made with regard to the former frequency of the disease throughout the extensive region from Utica to Buffalo. (p. 448)

Ludlow (60) also reported the frequent occurrence of goiter in the Genesee country in 1822, but in 1837, O'Reilly (61), after referring to Ludlow's statement, added " now, 1837, the reverse."

The same great temporal variation in the incidence of goiter, of which Hirsch (1) gives so many other examples is to be found in Pittsburgh. According to Denny (62) (p. 47):

> It does not appear that this disease prevailed among the French, who nearly a century ago occupied the site of Pittsburg as a military post. Some of the old inhabitants of Fort Duquesne who were living lately at Auka and Detroit, had no recollection of such a deformity on the banks of La Belle Riviere.

Denny states that in 1798, there were 150 cases among 1400 inhabitants that in 1806 whole families were afflicted with it, but that in 1825, a recent goiter was unknown.

Another instance is furnished by the experience of Nathan Trask (63). In the winter of 1803-1804, he settled at Windsor, Vt. Writing in 1808 (misprint for 1818? I. G.), he stated that when he settled there:

> . . . almost every female was affected with it [goiter] but the disease gradually decreased, at present it is nearly extinct.

There are a number of other reports of the endemic occurrence of goiter in various parts of the eastern United States at the beginning of the nineteenth century. Osler (64) wrote to physicians practicing in those places in 1893. In every case, the disease was much less prevalent than it had been, and, in fact, was usually unknown.

We may summarize the conclusions to be drawn from this survey as:

1. The Indians of the Great Lakes, Prairie and Rocky Mountain regions did not suffer from goiter before the coming of Europeans.
2. In many places, at least, the disease appeared first among the whites or half-breeds.
3. The disease, whether among Indians or whites, was most severe

and most frequent when it first appeared and subsequently diminished both in frequency and severity.

Guatemala and Mexico

In considering the Indians of the Great Lakes, Plains and Rocky Mountain regions, we were concerned with a more or less nomadic population of comparatively small numbers. We now turn our attention to a quite different situation: a high population density that equalled, if it did not exceed, that obtaining at any subsequent time.

In his memoir, Barton (9) referred to the occurrence of goiter in Mexico and gave as his authority Gage (65), who, about 1635, visited Mexico and travelled about extensively. He described the occurrence of very large goiters at Sacapulas, which is just across the border, in Guatemala (pp. 255-256), but made no mention of their occurrence elsewhere. It will be noted, however, that the date of his visit was more than a hundred years after the conquest.

There are several accounts of the conquest of Guatemala and of the life of the Indians that were written shortly after that time (66) (67) (68) (69). In none of these has any mention of goiter been found, nor is this condition mentioned by either Brasseur de Bourbourg (70) or by Genet and Chelbatz (71).

There seems to be no report, other than that of Gage, of the occurrence of goiter in Sacapulas. In 1939, Burbank (72) visiting this town, remarked on the beauty of the Indian women, but made no mention of goiter among them, although he did mention seeing a large goiter near Cantel, some forty miles away, in a straight line. However, goiter is now quite prevalent in Guatemala (73), and it is quite possible that there are instances in Sacapulas.

In 1798, the disease was so prevalent in Jacaltenango, in the same province, as to lead Hidalgo (74) to write:

> En este pueblo todos tienen gueguechos, a hinchadas de gargantas, a causa de las malas aguas que beben.

This is followed by a footnote referring to the astonishment which Gage experienced when he saw goiters at Sacapulas. However, although Sacapulas and all the other towns of the province were described by Hidalgo, there is no mention of goiter, *in his time*, except at Jacaltenango. It may have been absent elsewhere, or it may have been so common everywhere as not to excite attention except at such places as Jacaltenango, where everyone had a goiter.

In 1825, Thompson (75), travelling from Mexico City to Acapulco, saw, at Tierra Colorado, near Acapulco, three goitrous sisters, one of whom seems to have been a cretin. Thompson then continued his journey to Guatemala by sea. He disembarked at Acajatlan and went to the neighboring town of Sonsonate, both in San Salvador. Of the latter place, he wrote (p. 80):

> The inhabitants of Sonsonate, particularly the Creoles, are dreadfully affected with the *goitres*, or as they call them, *buches*.

Thompson made no mention of the existence of goiter elsewhere. After visiting Guatemala City, he left the country by practically the same route (Rio Yzabel) as was employed thirteen years later for entrance by Montgomery (76). The latter mentions the frequent occurrence of goiter at places visited by Thompson, but in which the earlier traveller did not refer to the presence of goiter.

Only a few years after Thompson, Dunn (77) also visited Guatemala, almost exactly reversing the route travelled by Thompson, but reaching the Pacific Coast some distance north of Sonsonate. He wrote (p. 256):

> In some of the provinces, the inhabitants are dreadfully afflicted with a swelling in the glands of the throat, vulgarly called "gueguecho": these sometimes grow to an enormous size and when accompanied by idiotcy or extreme imbecility of mind, which is by no means uncommon, they found a most humiliating and painful spectacle.

The names of the provinces in which this condition was observed are not given, and the idiocy mentioned by Dunn is not necessarily cretinism, because the sentences immediately preceding the passage just quoted are:

> The diseases of the coasts for the most part consist of intermittent fevers, which, when contracted by the inhabitants of the temperate zones, are very difficult to cure, frequently clinging to the sufferer till they produce the most perfect mental debility, and oftentimes idiotcy. The number of idiots and of individuals in other stages of madness is truly melancholy, and these the greater part have been produced by fevers contracted on the coast.

The occurrence of goiter in various parts of Guatemala, Nicaragua and San Salvador was also mentioned by Dunlop (78), Squier (79), and by Scherzer (80).

It is noteworthy that many of the places at which goiter is said to have existed were at relatively low altitudes and *near* the sea. Sonsonate, mentioned by Thompson (75), is on the coast, and Squier wrote (79), (Vol. 2, p. 154):

In Chinandega, as in fact in every other town of the state, I observed numerous instances of the goitre . . . Chinandega is only seventy feet, and Leon, Granada and Rivas not more than one hundred and fifty feet, above the tide water; yet in all these towns, the goiter is common.

Scherzer (80), page 428, made a similar observation regarding the occurrence of goiter at Guaymoco, barely 400 feet above sea level, and in 1864, Bernoulli wrote (81) (page 119):

Die Intensität der kropferzeugenden Ursache ist, wie in Europa, in verschiedenen Gegenden sehr verschieden; an den Küsten und in der Tierra templada ist sie im allgemeinen heftiger als auf den kälteren Hochebenen.

However, in 1938, it was precisely in the highlands that Shattuck (73) reported a high incidence of goiter: but only in one village were there "some, apparently of cretinism among the people gathered in the market place." If the idiocy seen by Dunn in 1828 was really cretinism, a great change had occurred during the following century.

Much of the present-day Mexico, especially the Valley of Mexico and the surrounding highland, was in pre-Cortesian days, the home of a large and settled population, possessing a written language. The high state of civilization encountered there aroused the interest and admiration of the Conquerors and of those who soon followed them to New Spain. There are several contemporary accounts of the Conquest, some of them by those who actually participated therein. The best of these is generally believed to be that of Bernal Diaz de Castillo. Blanton (82) has written of medical references in this narrative. He does not mention goiter, nor have I been able to find any reference to the occurrence of goiter in Bernal Diaz or in any other early narrative or description of Mexico.

Neuburger (83) includes goiter among the diseases recognized and treated by the ancient Mexicans(p. 47). He gives no specific authority for this, but states (footnote, p. 40) that the *Historia de la medicina en Mexico* by Francisco A. Flores "has been the basis for my article."

That author (84) wrote, under the heading "Laringitis" (Vol. 1, page 129):

Entre los affeciones de los anexos de la laringe parece que conocieron el bosio quechpozauiliztli ô tozcapuzauliztli, de que hacen mencion los autores que se occupan de su antiqua historia.

It will be noted that Flores used the word "bosio," which is current Spanish for goiter. However, he gave no authority for his statement regarding its occurrence in Mexico, and I have been able to find none.

Our great source of information for the daily life, the handicrafts and

the knowledge of nature possessed by the ancient Mexicans is the *Historia general de las cosas de Nueva Espana*, by Fr. Bernardino de Sahagun. This author was born in Spain in or about 1499. He came to Mexico, as a Franciscan monk in 1529, only seven years after the conquest. He soon interested himself in the life, customs, and knowledge of the Mexicans and began to write his book in Aztec about 1546. It was completed about 1570, but aroused the antagonism of the then Provincial of the Order, who had the manuscript and Sahagun's notes dispersed among the various convents of the order. A few years later, they were returned to Sahagun. In the meantime, a summary had been taken to Spain, and had come into the hands of Juan de Ovandes, President of the Indies, who ordered that a complete copy, with a Spanish translation paralleling the Aztec text, be prepared. This was done between 1576 and 1578 (85). Various Spanish editions have appeared and the complete text, with all of the many illustrations, has been republished in Aztec and in Spanish (86). Portions have been translated into English (85) and into German (87), and the entire text has been translated into French by Jourdanet and Simeon (88).

The Spanish text reads (Book 10, Chap. 2: (86), Vol. 3, p. 98):

> Para la enfermedad de las paperas, e hinchazones de la garganta, sera necesario frotar con le mano la garganta y sangarza y untar la garganta con cierte hierba llamada *cocozihuitl*, mezelando con cisco de la olla, y beber el agua de la hierba llamada *ahacaxilotic*.

The important word here is "paperas." This particular passage has not yet been published in either German or English translation, but Jourdanet and Simeon translated it as "goitre." However, all the authorities I can find agree in stating that "paperas" may mean not only "goiter," but also any swelling of the anterior part of the throat. Thus, the following definitions have been found:

a. tumor que se forma en la papado o en otros puntas del cuello, des de la garganta hasta las oregas (89).
b. tumor que se forma en la papado o en otros puntas del cuello (90).
c. (1) Wen on the throat
   (2) Mumps (91)
d. Mumps (92)

That the word "paperas" was, in Mexico, even in the sixteenth century, applied to a condition very different from goiter is shown by its use in the *Codex Telleriano-Remensis*, which was completed before 1562,

and in the *Historia eclesiastica Indiana*, by Mendieta, completed in 1596. The Spanish text of the former reads (93) (p. 44):

ano de seis conejos y de 1550 murieron munchos yndios en esta Nueva Espana de paperas.

Kingsborough (94) (Vol. 6, p. 151) translated "paperas" as "measles." Stecker (95) (p. 262), on the other hand, believed it was either mumps or diphtheria. The identity of the disease may be in question, but the author of the codex certainly could not have meant that many Indians died of goiter in that one year.

Similarly, Mendieta wrote (96) (page 515):

En fin del ano de noventa y cinco y entrado el de noventa y seis, al tiempo que yo esta escrebia, vino otra generalisma pestilencia, mezclada de serampion paperas y tabardillo.

The conjunction of "paperas" with serampion (measles) and tabardillo (scarlet fever) is clearly an indication that "paperas" did not mean goiter.

Besides the thirteen pages concerned with the diseases of the Indians and the twenty pages devoted to medicinal minerals and plants, Sahagun gave 23 closely printed quarto pages to a description of the various peoples of Mexico.[7] Among the people described by Sahagun were the Tarascans in Michoacan. He actually spent some time among them (85) (p. 7). He devoted a page, about 450 words, to a description of the inhabitants, but made no mention of goiter. If this disease had been endemic in Michoacan, or in any other part of the Mexican Empire, it is almost inconceivable that Sahagun would not have mentioned it.

In a footnote on page 229, reference has already been made to Moll's claim that Tarascan figures showing goiter have been found. None of this kind are to be found in the remarkable collection of the American Museum of Natural History, although there are several showing achondroplasia; nor are there any pictured in the 175 plates of Tarascan pottery and stone to be found in *Art in Ancient Mexico* (97), although there are two of two-headed human monsters.

Since Flores, there have been four writers on the medicine of the ancient Mexicans, whose work gives evidence of consultation of the original sources. These are Stecker (95), Gerste (98), Deuchler (99), and Ocaranza (100, 101). The last named gives the Mexican word for thyroid (100), p. 22, but none of these authors lists goiter as among the diseases known to the Mexicans.

[7] These numbers are taken from the French translation.

That goiter was not of general occurrence in Mexico, even as late as 1780, or shortly before that date, is made probable by the following quotations from Clavigero (102) (Vol. I, p. 78):

> There is scarcely a nation, perhaps upon the earth in which there are fewer persons deformed. . . . Among the young women of Mexico, there are many very beautiful and fair.

Vol. 2, p. 340:

> If the Americans were disposed to retaliate on M. de Pauw and other authors who wrote as he does, they would have abundant subject of material to their discredit on the climate of the old continent, and the constitution of its inhabitants in the endemic distempers which prevail there, such as . . . the goiter of Tyrol and many Alpine countries.

The earliest definite reference to the occurrence of goiter in present-day Mexico, dates from 1778, when Chappé d'Auteroche (103) reported its presence at Las Vigas, a village near Jalapa, on the road from Vera Cruz to Mexico City. The author travelled through Mexico on his way to California, but the only mention of goiter was at this place. About fifty years later, we have the previously cited reference (page 242) to its occurrence near Acapulco on the west coast, and Hardy's mention of it in various places in Sonora (104). About 1848, we have a record of its occurrence in Tabasco (105), a report which is repeated in 1865 (106), at which time we have also a report of its presence in Colima, on the west coast (107). It is noteworthy that Coindet (106), who reported the presence of goiter in Tabasco in 1865, explicitly stated that the disease was very rare on the high plateaux.

According to Starr (108), Najera (109) and Stacpoole (110), goiter has been, in more recent years, of quite general occurrence in Mexico. Of particular interest, in view of Coindet's statement that goiter was rare on the high plateaux in 1865, is Stacpoole's report of high incidence in different parts of the Valley of Mexico (110, 111) and the regions about it.

To summarize, we may say that there is no evidence that the ancient Mexicans or the Guatemalans suffered from goiter; that the number and character of the chronicles and descriptions of the country and its people make it extremely unlikely that the disease, if present, would have gone unrecorded; that the disease first appeared as sharply localized outbreaks of considerable severity, and that it later became more general, though not in the vicinity of the places in which it was first observed.

Peru

In his memoir, Barton (9) (p. 78) stated that goiter had been observed among the Indians of Peru, giving as his authority the translation of Garcilasso de la Vega's *Royal Commentaries of Peru* by Sir Paul Rycaut:

> This writer informs us, that the Inca Tupac, after having subdued the province of Cassamarquila, proceeded to another people called the *Papamarca*, from the *papas* or dewlaps which are great bunches that hang from their throats.

Barton also wrote (p. 78)

> Mr. de Pauw speaks of the goiter as a disease of the Indians inhabiting the foothills of the Cordilieres. He ascribes it to the use of snow water. He quotes as authority the voyage of sieur Acarette to Peru.

Barton was accurate in his quotation from Sir Paul Rycaut. Unfortunately, this translation is incorrect. Sir Clements Markham, in the introduction to his own translation of the Royal Commentaries wrote (112) (p. xvi):

> An abridged English version of the Royal Commentaries appeared in London in 1688, having been "rendered into English" by Sir Paul Rycaut Kt and dedicated to James II. The worthy knight had a very slight knowledge of the Spanish language and he did not scruple to make wild guesses at the meaning of sentences.

Markham, himself, translated the passage in question as (113) (p. 328):

> From Cassamarquilla the Ynca advanced to another important village called Papamarca, which means "the village of potatoes" because they grew very large there.

The Spanish text reads (114) (Vol. 2, p. 318):

> De Cassamarquilla paso a otro puebla principal, llamado Papamarca, que quiere decir, pueblo de papas, porque son muy grandes las que alli se dan.

Neither in the Royal Commentaries nor in any other of the early chronicles or descriptions of Peru have I been able to find any reference to the occurrence of goiter among the Indians of the Empire of the Incas. There are many references to the physical characteristics of the Indians, male and female, and to their diseases. D'Harcourt (115), who devoted a book to the medicine of the ancient Peruvians, lists some fifty of their diseases, but goiter is not among them.

Barton was equally accurate in his quotation from de Pauw (116) but the latter seems to have misrepresented his authority.

The original reads (117) (p. 11):

Sant Iago del Estro est un bourg d'environ 300 maisons, sans fossez ny murailles, situé en un pays plat, environné de forests d'algarobe, sur une assez grande riviere, qui porter batteau, et qui est assez poissonneuse. L'air y est fort chaud et fort étouffé, ce qui rend faineans et laches ceux qui y habitent. Ils ont tous le visage fort jaûne, et ne s'adonnent qu'a leurs divertissements et peu au commerce. Il n'y a plus de 300 portans armes tant las sauvages que les esclaves, et sont tous fort mal armez et peu aguerris. La plus part des femmes y sont assez belles, mais elles ont presque toutes une espece de loupe a la gorge, qu'on nomme en langue du pays coto, qui est apparement ce que nous appelons goitre.

There is no mention of foothills, nor of snow-water, nor of the disease affecting the Indians. In fact, it would rather appear that it was the white women and not the Indians who had the goiters.

This seems to be the only mention of goiter in Acarette's account of his travels from Buenos Aires to Potosi. However, that is now one of the great goiter regions of the world (1) (50), although much of it is only slightly above sea level. Santiago del Estero, itself, is 520 feet above sea level (36) (Vol. 19, 979).

Just when goiter made its appearance in Santiago del Estero is not known, but only about thirty years before the visit of Acarette de Biscay, Antonio Vazquez de Espinosa (118), who died in 1630, devoted two pages of his *Compendium and Description of the West Indies* to this town and its vicinity. These contain no mention of goiter. In fact, he wrote (p. 674) (folio 1772):

The city is built on the bank of a large river. . . . The water of this great river is so health-giving, that many bathe in it to recover their health.

There are a number of other references to what may have been goiter, but, more probably, was not, among the Indians about a hundred years after the Conquest. Thus, Pardal, in his book on the medicine of the American aborigines (119) (p. 231), quotes from a Bartolome de Vega as to the occurrence of "paperas debayo de la barba, tan grandes como cidras," among patients with "cancer," probably leishmaniasis, of the nose, in a hospital at Cuzco, established for victims of this disease.

Pardal gives no indication as to who this Bartoleme de Vega was nor as to when he lived, nor have I been able to find his name in an encyclopedic dictionary of Peruvian biography (120). The "paperas" may have been goiter, but may also have been mumps or some other kind of swollen gland (see pp. 244, 249). In any event, since this hospital was established by a viceroy who came to Peru in 1569 (120) and who first wished to abolish the growing of coca and who only thereafter established this hospital (115), it is evident that this reference, whether or not "paperas" means goiter, deals with a period at least fifty years after the Conquest.

Calancha (121), in 1638, wrote " en las tierras del Cuzco, y Chuquisqua hay alguna aqua que a tal o tal persona crian hinchazones en los gargantas, que llaman cotos, y en pueblos de las sierrae hacia Lima, crian algunas aquas, berrugus a tales complexion de gente."

Fifteen years later, Cobo (122) described the treatment of " paperas."

> Con cierta suerte Culebras pequenos, que o no son ponzonsas o su eficacia no es muy vehemente, suelen curar los Indio del Cuzco los paperas que es mal ordinario en aquella ciudad y que afea mucho a la persona que las tienne. Llaman en la dicha ciudad Cotos a estas paperas, y el modo como las curan los Indios es este, tienen algun tiempo sin comer una destos Culebras, y asiendola con la mano del cuero del pescuezo, la aplican a que muerda la paperas, con lo cual se viene a secar y para quitar el horor al paciente, le vendan los ojos, y si es muchacho, no le dicen la cura que le hacen ni sabe lo que le causo el dolor.

Vazquez de Espinosa (118) (p. 658, folio 1722), as translated by Clark, wrote:

> Chuma, which is a kind of spiny thistle, when sliced and roasted and laid against the sore spot on the goiter (goza) relieves the pain and dispels it; the Indians make use of the juice of this plant in their superstitions; they drink it and lose consciousness, and say that they see all that they desire.

The word used by Vazquez de Espinosa is goza, which Clark believed to have been an Andalusian cognate of the Italian gozza. Clark overlooked the fact that the Italian word gozza meant not only goiter, but any inflammation of the throat (123, 124). Moreover, there is no evidence for the existence of such an Andalusian word as " goza." To the present author, it seems that " goza," pronounced " gotha," was an attempt to represent the Quicha word which others have variously rendered as coto (117), goto (125), ccoto (126), and koto (127), which means a heap, a lump, a goiter (126)—or in the Spanish of 1608 (127), paperas, or, also, monton (heap, bunch).

The method of treatment described by Vazquez de Espinosa and by Cobo certainly does not indicate the disease in question was goiter. In fact, the particular mention given by Cobo to the treatment of the disorder in *boys* indicates, rather clearly, that the disease was mumps.

What " cotos " or " paperas " may have been is not certain, but it is interesting to note that in 1799, Unanue (128) listed paperas—clearly mumps—as a disease endemic in the fall in the vicinity of Lima.

In any event, whether cotos or paperas meant mumps or goiter or neither in the early seventeenth century in Peru, it must be remembered that this was a century after the Conquest. There is, it must be repeated,

no account of its occurrence among the Indians at the time of the Conquest.

About 1600, Poma de Ayula (129) wrote a lengthy work describing the inhabitants of Peru. He illustrated this with hundreds of drawings. I have not read all of the text, which is available only in facsimile reproduction of the seventeenth century manuscript, but I have examined all of the drawings. None of the human figures show the slightest sign of anything that can possibly be interpreted as goiter.

In Peru there have been found large numbers of anthropomorphic vases. These portray normal, blind and mutilated persons. They depict childbirth, sexual intercourse, normal and perverted, and various therapeutic measures, including trepanning, but there is but one showing goiter. This is in the Museo de Chiclin (130, 131) and depicts not simple goiter, but exophthalmic goiter. In fact, in the photograph sent me by Dr. Lastres (131), the goiter is not visible, though the exophthalmos is pronounced. Dr. Lastres has also seen vases depicting acromegaly and one showing achondroplasia (132). It is scarcely conceivable that if simple goiter had been endemic anywhere in the Empire of the Incas, which included not only what we now call Peru, but also most of Ecuador, a large part of Bolivia, the north-western part of Argentina and more than half of Chile, that we would not have at least one vase depicting the condition among the thousands that have been unearthed.

Ecuador

While much of what is now Ecuador had, shortly before the Spanish Conquest, become part of the Inca Empire, its later history is more closely associated with that of Colombia, or New Granada. The failure to find any reference to goiter in the descriptions left us by the early chroniclers of Peru applies also to the realm of Quito, or most of present-day Ecuador. Just when goiter appeared there cannot be definitely stated. It is noteworthy that neither Ulloa (133), Condamine (134), nor Bouquier (135), who visited Quito in 1740, reported the existence of goiter there, although both Ulloa and Condamine mention the presence of other diseases there. Even more significant is the fact that in Ulloa's *Noticias Americanos* (136), a chapter of 19 pages entitled " De las dolencias que son particulares, segun la variadad de los climas, y su comparacion," contains not a word concerning goiter. Nor is there any mention of this disease in Velasco's *Historia del reino de Quito* (137), written in 1789, although the physical characteristics and diseases of the Indians are dis-

cussed. Even in 1823, Humboldt (138) (139), who called the attention of Europeans to the existence of goiter on the eastern slope of the Cordilleras, did not mention its existence in Quito, which he also visited.

The earliest reference I have found is that of Empson (140), who in 1836 stated that the disease was especially frequent around Guayaquil, and that it did not exist among the natives of the higher regions of the country.

According to Dr. Jose Ramon Bolona R., Director General Accidental de Sanidad, only rare and sporadic cases of goiter are now (August 22, 1943) to be found in and around Guayaquil or other parts of the littoral. The disease is, however, quite frequent in certain portions of the northern inter-Andean part of the Country (141).

Colombia

In 1740, Bouquier (135) visited Hondo, and travelled down the Magdalena River, passing through districts in which goiter was, a few years later, extremely prevalent. I have found no mention of goiter in his account of his travels.

The first reference to goiter, in what is now Colombia, that I have found, dates from 1760 (142, a. p. 448; b. p. 323).

> Desda la embocadura del Cauca hacio abajo desaparece esta enfermedad; observacion interesante que debo a un medico sabio y observado que en 1760 visito esas regiones ardientes. El ilustre Mutis he ha dado a esta hecho las mas grande autoridad.

In the diary of Mutis, under date of January 16, 1762 (143), there is the following entry:

> Oi decir que los cotos de tierra caliente solian desvancerse en tierra fria; pero los de tierra fria, ni en tierra caliente ni en tierra fria. El Padre Reyes, religioso Dominico, me participo esta noticia.

Possibly, even probably, the "cotos"—at any rate, those of the "tierra fria" were goiters and the statement has reference to the occurrence of the disease in the country in 1762.

However, goiter was not very prevalent or was regarded as unimportant even as late as 1789, 1796 and 1803. In 1789, the Bishop of Cordoba, then Governor, in his report to his successor, wrote (144):

> La primera y mas terrible de estos epidemia es certamente la de los viruelas. . . . La elephanthium, o lepra lazarina, es otro de los males endemicos que en este Reino aflige a sus inhabitants. . . . Yo numero entre los plagas que impuden al aumento

de la poblacion de este Reino los enjambres de mendigos que llenan las calles de las principales ciudades. . . .

without as much as mentioning goiter.

I have not found any mention of goiter in the subsequent reports of the followers of the Bishop to their respective successors in 1796 and 1803.

However, by 1808 (142), and certainly, by 1823 (145), the disease was very severe in many localities and was spreading rapidly. This led the Minister of the Interior (145) to suggest that the government offer a reward for the discovery of a cure. The incidence of goiter seems to have been as high as ever observed anywhere:—whole villages being afflicted, and a person without a goiter being regarded as a freak.

Humboldt (138) (139) called attention to the fact that the disease had not been known in Bogota before 1790 and that in 1824 it was still rapidly increasing there, though its incidence was not yet as great as in other places.

In 1830, Boussingault (146) noted that certain districts of Colombia appeared to be free from the disease. He ascribed this to the use of salt mined locally, which salt contained appreciable amounts of iodine. However, he did not attribute the disease to a lack of iodine, but to a lack of air in the water, and reported several cases in which the use of water that had been allowed to stand for several days appeared to secure freedom from goiter.

Much of the country in which goiter has been prevalent for over a century and in which it still constitutes " una tremenda realidad nacional " (147), was, at the time of the Conquest, the home of one of the civilized peoples of South America: the Chibcha Indians.* Their Spanish and German conquerors seem to have been more destructive of all signs of the Indian culture than was the case anywhere else. They had little interest in the natives, except as they could secure gold and jewels from them. Nevertheless, according to Markham (148) (p. 15), Quesada, the chief conqueror, said of them:

They were the finest people he had seen in the Indies; the men well-formed and strong; the women handsome.

Certainly, there is no evidence here of the presence of goiter.

We may, therefore, conclude that in South America, as in North America and Central America, the evidence shows that goiter was not

* Markham (148) estimates their number shortly before the cataclysm as 1,200,000, or 200 to the square mile.

endemic among the Indians, that it appeared after the coming of white men, in most places only a century or more thereafter, and that it was at one time very common in some places in which it later became infrequent.

New Zealand

In the course of their report on the correlation between the low iodine content of certain New Zealand soils and the incidence of goiter in the districts from which these soils were obtained, Hercus, Benson and Carter (149) refer to previous reports regarding the nonoccurrence of goiter among the Maoris in the following terms (p. 131):

> Enquiry from old Maoris established the fact that goiter has been prevalent in this region (Urawera, I. G.) for a considerable period, certainly before European occupation of New Zealand, in spite of numerous published statements to the contrary. This fact was later confirmed by Sir Maui Pomare, Minister of Public Health, who pointed out that the Maori language has contained the name "tenga" meaning goiter for many generations. The disease occurred amongst such isolated tribes as the one under investigation and was unknown amongst the coastal tribes, where fish and edible seaweed bulked largely in the dietary.

It is not clear from the context that Sir Maui Pomare meant the "many generations" to antedate the coming of white men. If he did, and the statement is otherwise pointless, it is in order to ask how one can be certain that a word existed for "many generations" in a language that had no written literature. One would also like to know how one can be certain that the word "tenga" meant "goiter" and not merely any swelling in the neck, particularly since it is known that scrofula was very prevalent at least as early as 1854 (150).

As a matter of fact, the word "tenga" appears in early Maori-English dictionaries as meaning "Adam's apple" (151) and that is the only meaning ascribed to it as late as 1891 (152) and 1911 (153). The earliest use of the word as meaning "goiter" that I have been able to find was in 1917 (154), when it appeared as the *third* of a series of *six* meanings. The others were: 1) Adam's apple, 2) crop of a bird, 4) distended or strained, 5) gorged, 6) extinguished.

A similar word "ngene" appeared in a small phrase book in 1911 as meaning "goiter (153), but in 1891 (152), it had been defined as "a scrofulous wen," and in 1917 (154), three meanings were given: e. g., 1) scrofulous wen, 2) wrinkle, fold, 3) fat. The earliest Maori equivalent for goiter that I have been able to find is "Pukaki" in 1891 (152). This word is defined as a wen, a goiter, a scrofulous swelling in the neck.

It is said to be derived from "pu," a bundle, a bunch, and "kaki," the neck.

The failure to include a word for goiter in early dictionaries may have been due to ignorance of the early lexicographers of the Maori language, and, in particular, of that of the tribes of the Urawera region. However, it is curious that the dictionaries published before the first recorded outbreak of goiter do not include a Maori equivalent, whereas those published thirty or more years later, do. Certainly, it cannot be seriously maintained that "tenga" meant only "goiter" or that the Maoris were more successful in distinguishing goiter from scrofula than were Englishmen of the same period (see below). The claim that the use of the word "tenga" indicates the existence of goiter among the Maoris, prior to the arrival of Europeans, may, therefore, be dismissed.

Nor can one accept the statement of "old Maoris" in 1925 as to the presence of *goiter* a century earlier. No other account of native life and customs that I have been able to find mentions the existence of goiter. Among the "numerous published accounts to the contrary," it is necessary to mention only three; (150), (155), and (156).

Not only does goiter seem to have been unknown to the Maoris, but it appears that the early European settlers were similarly free from the disease for a considerable period. The earliest mention that I have been able to find refers to its occurrence in 1880. The vicinity was settled in 1850, but the first reference to goiter is thirty years later, and is not to an isolated case, but to an endemic condition (157, p. 60, and 158).

> On taking office at the Asylum, I was surprised to find so many patients suffering from goiter. . . . The attendant's children suffered from it, and there is no doubt but that it is endemic here and especially so in this vicinity.

We are, therefore, quite justified in adding New Zealand to the list of countries in which goiter was unknown before the coming of white men, but in which, when it appeared, it rapidly became endemic.

England

The Oxford Dictionary (159) attempts to list the earliest occurrence of every English word. "Goiter" or "goitre" was first used in the seventeenth century and was applied to a condition observed among the inhabitants of the Alps, Savoy, etc. The word "wen," as applied to a protuberance in the *throat*, was used as early as 1530 (160), but only as a translation of the French word "gouistre" or "gouystre." In 1617

(161), it was employed in a description of the people of Styria and Carinthia. The first use of "bronchocele" is credited to *A Physical Dictionary* of 1657, which is not available to me.

The mention of the goiters or "wehnes in the neck" of the inhabitants of Styria and Carinthia by Fynes Morison (161) is particularly interesting. He saw these in 1593 and mentioned them in the book he wrote between 1605 and 1617. In this book he also included a description of the various shires of England. He gave only fifteen lines to Derbyshire, but did not include any mention of goiters or wens there, nor did he mention their occurrence anywhere in England.

In "The Tempest," Shakespeare has Gonzalo says (Act 3, Scene 3, line 44):

> Faith, sir, you need not fear. When we were boys,
> Who would believe that there were mountaineers
> Dew-lapp'd like bulls, whose throats had hanging at 'em
> Wallets of flesh? or that there were such men
> Whose heads stood in their breasts? which now we find
> Each putter-out of five for one will bring us
> Good warrant of. . . .

The phrase "putter out of five for one" means a traveller and reflects an inverted form of life insurance that was in vogue in Shakespeare's day (162). The reference to "mountaineers, dew lapped like bulls" is generally believed to be to goitrous individuals seen in the Alps, etc., and reported to the English by returning travellers. Certainly, if goiter had been common in England about 1610, or earlier, Shakespeare could scarcely have had Gonzalo mention this condition as one unheard-of in his boyhood and only recently described by travellers.

Harington (10) credits Wiseman (1676) with the recognition of goiter, or bronchocele, in England. This particular edition of Wiseman's treatise is not available to me, but later ones are. The fifth and sixth editions (163) (164) published in 1719 and 1734 respectively, contain thirty reports of cases of the King's Evil. Of these, fifteen concern tumors in the neck, and of these, two are called bronchocele. One of these is described as:

> a complicated Tumour lying on the left side of the Neck.

Wiseman:

> . . . made a puncture into the Body of it and discharged a stinking Serum not unlike Horse-piss.

(Vol. 1, p. 444 (163)) (Vol. 1, p. 452 (163)). The other supposed bronchocele was in a girl of fourteen ((163), Vol. 1, p. 45). It was a

> . . . complicated Tumour of great bulk on the left side of her neck and cheek, arising under her ear.

It was treated with escharotics, broke down and

> We thereby discovered the tumour to consist of many several species, viz., Struma, Atheroma, Meliceris, and Steatoma.

Certainly, the first case was not goiter, and in all probability, neither was the second.

The word "bronchocele" was also used by Salmon (165) in 1680, who describes the removal of a bronchocele. The description, including such terms as "the bag," "the little artery by which it is fed" plainly indicates that a scrofulous lymph gland is meant.

Bronchocele was also discussed by Brown (166) in 1684. He mentioned its frequent occurrence in Piedmont and seems to indicate that he, himself, had seen cases, presumably in England, for

> I have known many people also cured of this by His Majestie's gracious touch only.

Brown's account, which is too long to quote here, is an excellent illustration of what seems to have troubled the English physicians of his day. They had read of goiter or bronchocele in Piedmont and elsewhere, and some of them had, possibly, seen cases in the course of their travels. They saw many tumours of the neck in England, and, naturally tried to identify some of them with what they had seen, or read of, among the people of the Alps. However, what they saw in England was scrofula and not goiter.

The same confusion is to be found in John Friend's *History of Physick*, written in 1723 (167), Vol. 2, p. 148:

> Tumours very often happen in the *Thyroidal* glands, but such a swelling is not properly called a *Bronchocele*, though sometimes so miscalled, but a *Struma*, or *Scrophula colli*.

The first clear indication of endemic goiter in England is to be found in the use of the terms "Derbyshire Neck" or "Derby Neck." The Oxford Dictionary credits Prosser (168) with the first use of this term, in 1769, but it is also to be found in James' Medical Dictionary of 1743 (169). The confusion with scrofula is still evident in the latter, and, indeed, it persisted for many years—even into the nineteenth century, as evidenced by Bell in 1801 (170) (Vol. 1, page 277):

> Every indolent tumour, situated on the forepart of the neck, is commonly called a bronchocele.

That goiter was not prevalent in Derbyshire as late as 1700, is indicated by the fact that Leigh, a Doctor of Physick, did not mention it in the fifty-pages devoted to distempers in his *The Natural History of Lancashire, Cheshire and the Peak, in Derbyshire.* Among the diseases mentioned were concretions, rickets, scrofula, scurvy, consumption and dropsy. It is scarcely conceivable that goiter, if as prevalent as in 1743, when it already was known as " Derbyshire neck," should not have been mentioned.

According to Wilmer (172), the use of burnt sponge in the treatment of bronchocele in the vicinity of Coventry dates back to more than 20 or 30 years before 1779. Whether or not all of the cases so treated were goiter, there can be no doubt that at some time before 1743, goiter had become endemic in Derbyshire. By 1800, " swelled necks " were also reported from Gloucestershire and Shropshire (173); and, in 1824, bronchocele was common in some parts of Westmoreland (174). During the decade 1825-34, goiter was occasionally observed in Devonshire, but during that period, of 11, 259 patients admitted to the Exeter Dispensery, only 39 had " bronchocele." The number per year varied from 1 to 7 (175). By 1836, goiter was described as occurring in Buckinghamshire and in London (176) and in Yorkshire (177).

Accurate information regarding the incidence of goiter in Derbyshire in the eighteenth and nineteenth centuries is not available. However, it is interesting to note that Webb (178) in 1886 wrote (p. 687):

> It is much less prevalent now than it was thirty years ago, and yet the women drink the same waters.

Derbyshire was not, in 1924-5, the date of a fairly complete survey (179) (180), the district in England and Wales showing the greatest incidence of goiter. That was to be found in Cornwall, Devon, and Somerset and in Oxford, Buckingham, Hampshire and Wiltshire. In fact, at least one-fourth the area of England seems to have had as high an incidence of goiter as had Derbyshire and only one-half had a decidedly lower incidence. It would seem that the disease had spread from its original focus and is now, or was recently, more prevalent elsewhere.

Discussion

Why was there this unenviable predominance in the incidence of goiter in Derbyshire in the middle of the eighteenth century? Why did goiter

become generally prevalent in England later, although unknown or at least unnoticed elsewhere in England until the beginning of the 19th century?

It may very well be that the concentration of iodine in the food and water diminished in the course of time. Nearly all iodides are very soluble, and it is possible that they tend to leach out of the soil. The same explanation, plus the changes in the character of the diet, may be offered for the present, or recent, incidence of goiter in New Zealand and in the Americas, particularly in the Great Lakes region of North America. However, these will scarcely explain the known great *decreases* in the incidence. Only a few of these have been mentioned in this review. There are many others instanced by Hirsch (1) who also collected many reports of the outbreak of goiter in truly epidemic fashion. In some of these, the drinking water seems to have been implicated; in others, it was at least as clearly not the precipitating agent. It is impossible to read these accounts without being impressed with the resemblance to the reports of the outbreak of poliomyelitis; sometimes apparently water-borne; sometimes, apparently due to personal contact. Nor can we dismiss the successful production of thyroid enlargement and goiter by McCarrison (181) simply because he was unable to secure the same results later.

In his Harvey Lecture, Marine said ((182), p. 108):

> The immediate cause of thyroid enlargement is a relative or an absolute deficiency of iodine. This deficiency may result from
>
> 1) any factors which increase the needs of the organism for the iodine-containing hormone. . . .
> 2) any factors which interfere with the absorption or utilization of the normal intake of iodine. We have no knowledge, as yet, of such factors, although it is conceivable that the intestinal parasites could utilize or divert part of this iodine intake.
> 3) factors which bring about an abnormally low intake or actual deprivation of iodine, either natural or experimental.

We now know several chemical factors that produce goiter, or at least bring about thyroid enlargements in animals on diets that are otherwise satisfactory (183) (184) (185). There is, a priori, no reason why biological agents should not produce the same effect.

Fully conscious of the paucity of the evidence, the author ventures to revive the old suggestion of Humboldt, Hirsch and others that goiter may be due to a biological agent. In the author's opinion, this agent was present in western Europe, about two thousand years ago, only in the

Alps. From there, it has slowly spread over the rest of western Europe and to New Zealand and to the Americas. In many instances, its first appearance was marked by severe outbreaks, after which the disease became less active.

With this hypothesis in mind, an attempt was made to search the history of Derbyshire for some occurrence that might indicate why goiter appeared in England, at first in this locality and, only later, elsewhere.

It was found that up to the early part of the eighteenth century, England was dependent upon Italy for the supply of a certain important kind of silk yarn. In 1717, John Lombe travelled from Derby to Italy, found employment in a silk mill in Piedmont, learned the method of preparing this yarn, and brought back to Derby with him two natives of Piedmont (186) (187). This part of Italy is a notorious goiter district and it is an interesting speculation that Lombe or his two companions introduced not only silk-throwing, but also goiter into England.

That, in the space of 25 years, goiter should have become so prevalent in Derbyshire as to achieve the appellation "Derbyshire neck" and the inclusion of this term in a dictionary is remarkable. However, it seems little, if any, more remarkable than the prevalence of goiter and cretinism in Edmonton 11 years after its founding and about 20 years after the first settlement by Europeans anywhere in the vicinity, and its virtual disappearance within eighty years. And it is certainly no more remarkable than the rise of the incidence of goiter from zero to over 10% and its subsequent fall to zero in Pittsburgh, all in a space of less than fifty years.

Summary

Examination of the reports of early explorers, travellers and missionaries discloses no evidence of the presence of goiter in the Americas or in New Zealand before the coming of Europeans. In every case, the earliest reports are to the occurrence of the disease among white men and women. The detailed accounts of the physique, diseases and mode of life of the natives to be found in these early reports assure us that endemic goiter, if it existed, would have been recorded. It is, therefore, concluded that it did not exist. In several cases, we have definite statements on the part of early explorers and residents to this effect.

Early in the nineteenth century, goiter became very prevalent in certain places in both North and South America. Later its incidence declined in many of these.

Examination of English literature indicates that goiter was known to Englishmen only as a disease that was prevalent in Switzerland and in neighboring alpine regions, until the eighteenth century, when it quite suddenly became prevalent in Derbyshire. Later, its occurrence became more general, and this district lost its pre-eminence.

Reference is made to the many other instances of variation in the incidence of goiter and of epidemic outbreaks to be found in the literature. It is suggested that these indicate that one factor in the production of goiter is a biological agent, possibly a virus, brought into Derbyshire, with the introduction of silk-throwing, from Italy in 1717 and into the Americas and into New Zealand by white men at different times.

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EMPIRICISM AND RATIONALISM IN PAST AND PRESENT MEDICINE

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Through the whole history of medicine there runs, like a bright thread, a more or less permanent struggle between two principal tendencies—empiricism and rationalism. The former, or empirical trend, lays its emphasis on helping and the cure of the sick. The latter, or rationalistic trend, lays its main emphasis on " scientific " explanations for the causes of disease and the methods of treatment.

During this struggle many rationalistic systems have been developed and have gained control in the study and application of medicine. At such times it has very often happened that everything which did not fit into the actual rationalistic conception, or everything which could not be explained on the basis of the prevalent theories, was eliminated regardless of its value in practice.

Today we are living once more in such an era of extreme intolerant rationalism. We can see the displacement of simple, valuable—nay, fundamental and indispensable—traditional methods of healing in favor of a more sophisticated, theorizing, experimental and technical trend, guided by an exaggerated application of such auxiliary sciences as physics, chemistry and physiology. This trend has even gone so far that established clinical experience has been replaced by the neo-scholasticism of natural science.

Nor is this state of affairs a mere academic proposition, since it influences decisively the fate of the sick. For this reason leaders of the profession, such as Cushing, have spoken of " Medicine at the Crossroads," and in Europe such outstanding authorities as the surgeons Bier and Sauerbruch have spoken of a " Crisis in Medicine." In this country Soma Weiss of Boston has repeatedly uttered his dissatisfaction with our general approach to the practice of medicine and asked for " crystallization of fundamental principles, instead of collecting only exact but unrelated facts." The dilemma thus spoken of existed during the last generation in the medical schools of Europe. It is still greater, although not yet sufficiently recognized, in America, since the trend for positivism, rationalism, mechanization, technicalities and standardization in all fields is stronger in this country than in Europe with its more traditional and humanistic background.

No reasonable person will underestimate the splendid progress made during the past hundred years in public hygiene, surgery, X-ray, the conquest of epidemics, the discovery of insulin, hormones, sulfa drugs, etc. In spite of all this there are still many severe shortcomings which could be easily overcome if our approach to medicine were less rationalistic, dogmatic and theoretical and more broadminded, flexible, liberal, practical and empirical. We should never lose sight of the primary importance of the practical knowledge of healing, based on long collected experience. And we should avoid making a fanatic religion out of a onesided zeal for "scientific explanation," which already borders on modern superstition and rigid dogmatism.

There are many factors in present-day practice which should make us more reflective: Is it necessary that men should die so frequently of heart attack, often apparently in full vigor of life, at the early ages of 45 to 55, in spite of the best available medical care? Is it necessary that public and private mental institutions be permanently overcrowded, in spite of psycho-therapy and modern shock-treatment? Why is osteoarthritis, one of the most lengthy, costly and crippling of the chronic diseases, still considered a nearly intractable condition although there are quick and effective methods available? Why is it possible that in a recent discussion, one of New York's outstanding specialists for stomach diseases could call the present management of chronic indigestion and of ulcer not only a medical stumbling block but even a medical disgrace? Such challenging questions concerning the helplessness of experimental medicine in many practical problems could be multiplied at will. We shall give the answers later on.

Let us state it frankly: our methodical, epistemological and practical approach to the most urgent problems of everyday practice is utterly onesided, incomplete and, therefore, unnecessarily often doomed to failure. This statement is based on the author's experience of more than 25 years of research, teaching and observation in clinical and private practice. It can be supported by a large number of case histories, reporting successful cures in cases where the customary treatment had failed. Other followers of this more comprehensive and liberal approach (called Constitutional-Therapy) have had the same good results.

Instead of the "destructive scepticism" still prevailing in modern medicine and recently condemned by Dr. Sigerist, we wish to introduce a constructive criticism, showing a theoretical and practical way out of the dilemma. The most frequent and most dangerous misconception, even among highly educated physicians, is a belief in those facts only which

can be controlled by measurements or laboratory tests. This principle has been used increasingly since the time of Galileo and has proved effective in physics, chemistry and technic. But in dealing with living organisms, if we are sincere, we must admit that only the smallest and often less important parts of all processes of life and pathology can be measured. The rest can be understood only through collected experience and observation. In other words, rationalism is not enough; it must be completed by clinical empiricism, which comprises nine-tenths of all our effective therapy.

In order to explain everything in clinical pathology and therapy in a rationalistic manner, and to use rational therapy only, we would have to understand every detail of the processes of life. But we are far from being able to do that, and our methods of control, analysis and measurement are still much too clumsy and primitive in comparison with the intricate physiologic and pathologic reaction of the body. This, according to many outstanding medical thinkers, will remain so for many years to come, if not forever.

To give an example; the three methods of modern shock-therapy for mental diseases—insulin, metrazol and electric shock—are purely empirical, that is, not based on rationality, since their mechanism is not understood, but they are often very effective.

Such everyday clinical symptoms as pain, numbness, dizziness, spasms, can hardly be checked by any laboratory test, although they may be of vital importance as danger signals in fatal cases. Moreover, the most striking healing effects in osteo-arthritis, in which swelling, pain and restriction of mobility have been cured, usually do not show any difference at all in X-ray pictures or chemical tests before and after the treatment. Nevertheless, rigid adherents of the rationalistic trend object that the most important proof—namely, the healing effect—is not convincing or sufficient to satisfy scientific criticism, and claim that it must be supported by laboratory tests, which, as we have seen, are not even competent. This, we must say, is a fundamental misunderstanding of the very task of medicine, although this attitude is the most widespread among up-to-date scientists.

This is one of the weak spots of modern scientific medicine because it encourages sectarians and quacks, who use the neglected empirical methods, while science bans all cures which cannot boast a stylish scientific origin, often shrugging its shoulders and declaring that there is no cure at all for certain conditions, e. g. osteo-arthritis.

Logical and philosophical thinking, the latter completely lacking in

modern medicine, would conclude from such examples that we are obliged to consider and to investigate all the other existing empirical methods in order to decide whether they are effective in therapy. As a matter of fact, a " Comparative Therapy " of all times and nations, which should be considered a matter of course, would yield the most surprising and fruitful results. The usual attitude in our up-to-date medical education, however, is that everything that has been used in medicine before our rational and " truly scientific " era, that is, until about 100 years ago, was nonsense and superstition. Consequently, most of the historical, traditional medicine before Virchow's cellular pathology has been proudly thrown overboard as being unexact and not worthy of an educated physician. This was and still is a fatal error, causing large-scale impoverishment of our therapeutic efficiency. Many conditions, especially among the chronic diseases, have been cured more quickly, more simply and more successfully by our medical predecessors than they are by us today when we follow only the customary rules of experimental medicine.

This challenging statement refers not only to heart conditions, arthritis, stomach and mental diseases, but also to many conditions of the skin, eyes, ears, kidneys, gall bladder and female organs.

To avoid any misinterpretation we shall try to define more clearly the contrast between empiricism and rationalism. Empiricism, as this author understands it, is the more practical trend, mainly directed to the aim of healing. Rationalism, on the other hand, stresses more the theoretical basis. The present desire to point out the "rationale" for every treatment, means to give an up-to-date theoretical explanation, stressing the law of causality.

There might be, however, a difference in the meaning of the expressions " rationalistic " and " rational." " Rationalistic " means, based on theory. " Rational " may express the same, but in addition, according to a suggestion of Dr. Sigerist, may also mean " useful " and therefore reasonable. An originally empirical treatment, such as the treatment of burns with fresh onions by Ambroise Paré, as quoted recently by Sigerist, may also become " rational," because it is helpful.

But in the original sense, since Galen, the expression " empiricism " has been used in contrast to " rationalism," characterizing the contrast between practice and theory.

A brief historical survey will make the situation still clearer.

The Struggle Between Empiricism and Rationalism in the Past

A. *Antiquity*

The modern psychological trend in medicine, when dealing with the medicine of the pre-historic nations and primitive tribes, condescendingly is accustomed to stress magic and religious procedures, thus branding it mainly as superstition and quackery. But the historians admit that besides magic medicine very early, if not earlier, an instinct of healing (like in animals which do not use magic at all) and experience, collected a tremendous amount of positive empirical knowledge and skill.

It was in this way that " scientific medicine " acquired from the American Indians the knowledge of coca leaves (cocain), the cinchona bark (quinine), and from other primitive nations the knowledge of opium, hashish, sarsaparilla, guajac, jalap, podophyllin, condurango, quassia, jaborandi (pilocarpine), lobelia (Indian tobacco) and many others. In recent years mescaline, which had been for centuries used by the natives of Central America was rediscovered as a novelty by medical science.

These primitive nations knew also very effective methods of counter-irritation for rapid cures of arthritis, neuritis and neuralgia, from which we could still learn a great deal today. It was only recently that American medical journals reported on tattooing as a cure of neuralgia, used successfully by African tribes. We are in need of such " empirical " methods, since neuralgia with neuritis and arthritis is still considered a stubborn, lengthy and often refractory condition, as long as we stick to the customary " rational " treatment of up-to-date medicine.

Even today rationalism or the use of the pure intellect is not enough if we are to make discoveries in science or to find useful hypotheses. Intuition and imagination are equally necessary in diagnosis and therapy.

Later in history religious and philosophical systems tried to adapt and to combine the empirical knowledge of medicine with their own conception. We can find this in Egyptian and still more often in Hindu medicine. As is known, with the Greeks the Ionic natural philosophy (a kind of primitive natural science, a primitive physics and chemistry) introduced the four elementary qualities (warm, cold, wet and dry) corresponding to fire, air, water and earth and the four cardinal humors (blood, phlegm, yellow and black bile), which means a primitive physiology or biochemistry in a truly scientific sense. This primitive " natural science " was supposed to interpret the collected knowledge of experience. As in Hindu and Chinese medicine pneumatic doctrines were added which

considered the air (pneuma, today we would speak of oxygen) as the most important vital principle, whose aberration from the normal might cause all kinds of diseases, e. g. murmurs in the ears.

These doctrines at that time played the same role in medicine as our up-to-date " natural science." It was believed they would aid in achieving a better intellectual penetration and foundation of the knowledge of healing, as well as keener observation. Of course, this was true to a certain extent, although we realize today how primitive the scientific conceptions and tools were at that time. But 100 years from now our own successors will say exactly the same about our present day methods. This is one more reason to have a modest, just and positive attitude towards the healing methods of the past.

Hippocrates quite definitely was opposed to an exaggerated application of the natural science of that time called " natural philosophy," and he preferred certain experience, saying: " Until we will be able to motivate medical treatment by philosophical theories on the basis of minute knowledge of human nature, still much time will pass; but by means of the medicine of experience this is possible already at present." Furthermore: " Others may give better explanations; with that they show only a greater loquacity of their tongue."

As we pointed out before, the same thing holds true today, in spite of all the progress made in the meantime.

In his treatise on " Ancient Medicine " Hippocrates turns violently against those who ignore the history of medicine and despise traditional wisdom based on experience and observation. One of the most important principles of the medicine of experience is an understanding of the self-healing power of the organism (called *physis*), and the support of this tendency by proper medical treatment. In imitation of the natural processes (crises) of healing such as diarrhea, vomiting, sweating, hemorrhages, abscesses, fever and skin rashes the fundamental methods of elimination were developed and refined to the highest degree: purging, emetics, sudorifics, bleeding, counter-irritation. From early antiquity until 100 years ago they achieved the most remarkable cures. But these very methods of elimination have been discarded and misbranded by modern " rationalistic " and " scientific " medicine as outmoded and unscientific. This again is a fatal error, which explains clearly why many diseases have become intractable or even incurable, which were cured easily by earlier " empirical " methods. By the way, the term " empirical " is not accurate, because so-called empirical knowledge is often derived from earlier " scientific " medical systems such as humoral pathology and its different stages of refined development in vogue until 100 years ago.

Today Hippocratism is still the worshiped ideal of educated physicians. But during the last 100 years it has remained more or less lip-service. We should consider not only the ethics of Hippocrates, but also the practical side of his doctrine. Iago Galdston at one time (1941) in this *Bulletin* wrote on Hippocratic diagnosis and said: "The Hippocratic or Constitutional form of diagnosis (considering the individual as a whole) is by far the superior and more difficult function, whereas our up-to-date way is a more primitive function, a kind of crib, as the philosophers call it, requiring but a moderate mental discipline. It is mostly accomplished by the utilization of a variety of inanimated instruments. It offers only a narrow and not too stable foundation for effective therapy."

If we admit that Hippocratic diagnosis is far superior to ours, why not also consider earnestly the Hippocratic principles of therapy? This, as the author has proved during the last 25 years, is still more important for suffering mankind than the most splendid dialectic explanations.

A new kind of "natural science" was brought into medicine by the School of the Methodists in Ancient Rome (Asklepiades, Themison, Soranus) (about 90 B. C.–60 A. D.). With great emphasis and self-confidence they declared the established humoral pathology, proved for centuries by experience, to be old fashioned and they aimed to supplant it by a "scientific" doctrine of solidar pathology as a guide for the understanding and treatment of diseases. As a basis for their system they planned to use the "modern" physics of that time (we may think of Archimedes and his mechanics). This system of physics was very simple, because it recognized only two main properties of the bodies, namely the contraction of the pores of tissues (called "status strictus") and the relaxation of the tissues ("status laxus"). From this reasoning, apparently very simple, "scientifically" exact and accurate, the methods of treatment resulted. In the first case relaxing, in the second case astringent remedies were prescribed.

In some conditions they were and we are still today successful with this principle. Astringents or tonics in the different forms of relaxation and asthenia, e. g. in uterine hemorrhages and gastric atony even deserve much wider use, as we shall explain later on. On the other hand, there are many hypertonic and spastic conditions in which earlier physicians used successful relaxing remedies and methods which we have forgotten or discarded, among them purging, sweating, bleeding and non-narcotic antispasmodics such as acetic ammonia and ipecacuanha.

But since a large number of conditions do not fit at all into this Procrustean bed of a too narrow schedule, short-comings occurred very soon

in practice. This became still more evident as they consequently discarded the methods of elimination based on traditional humoral pathology, just as we do today, thus increasing therapeutical failure.

The same thing happened 19 centuries later when Virchow, introducing as the Methodists did a pathology of the solids (solidar pathology), radically discarded all the established methods, e. g. purging and sweating won by collected experience and based on traditional humoral pathology. Again set-backs in practical therapy were the consequence, causing disappointment among patients and physicians and the rise of a new wave of sectarians (especially naturopaths) and quacks.

As a reaction against exaggerated dogmatic speculation the School of Empiricists had originated in Alexandria (about 180 B. C.). According to them, experience alone makes the good physician. A characteristic principle of theirs was the Empirical Tripod of Glaukias: experience of the physician himself based on observation; historical tradition of the empirical sentences of earlier physicians; and conclusions of analogies in new diseases based on observations, were considered as the only permissible medical methods. They promoted materia medica, but neglected somehow anatomy, physiology and pathology.

It was Galen (second century A. D.) who successfully combined both trends, the empirical as well as the rationalistic. This very fact may explain why his doctrine dominated medicine for nearly 1500 years. In his encyclopedia of the whole medicine of his time (20 volumes) he pointed out that the foundation of medicine should be (1) experience (*peira*) and (2) the direct certainty of the intellect (*logos*).

Later on Galen was accused of being too speculative, indulging also too much in teleology. But studying his writings we still will find an enormous treasury of practical wisdom and many useful suggestions for the impoverished therapy of our days. He practised a renascence of Hippocratism, enriched by many new remedies of the centuries before him. Thus he was able to cure the severest forms of arthritis, even those patients who had to be brought to him by "cart and wagon." In his *Methodus Medendi* he demonstrated on numerous practical examples the fundamental value of the methods of elimination on the basis of refined indication and performance. Such contributions as "On diseases which can be cured by venesection" or "Indications of purging" should give us a great deal of thought today still.

Strangely enough, in contrast to Hippocrates, Galen's writings have been read very little during the last 100 years, and this is certainly to our disadvantage. There is also no translation of Galen's complete work into

a modern language. Undoubtedly he must have been an unusually successful physician in his practice, which should be reason enough to study his writings again.

B. *Middle Ages*

This period, as is known, was characterized by conservatism and the following of tradition rather than by new developments. Medicine was more international and uniform, without the national tinge of modern times. Religious and humanistic philosophical interests often prevailed over direct observation of nature, finally degenerating into speculative scholasticism.

There were then of course, many outstanding practising physicians in Europe and among the Arabs. But as a whole medicine tried to make the theories of Galen still more precise and systematic, so that finally it was driven to an almost mathematical degree of apparent exactness. Thus rationalism went to another extreme and other forms of cognition were lost at that time. "Scientific" medicine became petrified and too remote from life and nature.

C. *Modern Times*

This was the situation met by Paracelsus and by Ambroise Paré, both living in the sixteenth century. Both were eminent practitioners, fighting against the too narrow minded "scientific" medicine of that time.

Everything that did not fit into the dogmatic system of Galen and his followers (e. g. Avicenna) was considered "unscientific." On the other hand, an extensive and successful therapy had developed among the barber-surgeons and in lay-medicine, which was often effective where scholarly medicine declared itself helpless.

Characteristic is the story of a king of France who had been suffering from a malignant fever and dropsy and was declared a hopeless case by the physicians of the court. Finally he was abandoned to the empirics, which means in this case lay-healers or quacks. They administered an emetic and the king recovered within a few days.

The textbook of Ambroise Paré is full of such surprising cures, especially involving stubborn cases of arthritis. He used intricate methods of purgation and counter-irritation.

We have the same situation today. Modern dogmatism guided by the onesided and exaggerated spirit of the laboratory, has declared such practical procedures of earlier medical systems as "unscientific" and nine-tenths of all the practical knowledge of the past, especially the funda-

mental methods of elimination, have been discarded. Frequent failure, especially in chronic diseases is the result.

In a still more violent way Paracelsus attacked the rigid dogmatism of the universities of his time. He too was convinced that an enormous amount of practical wisdom had been collected in folk-medicine and by the practical wound surgeons. Moreover, he added his tremendous knowledge of herbs and of alchemy. He claimed to have cured severe cases of arthritis with preparations of gold, mercury and antimony. His claims were based on practical success, but the hyper-rationalistic theorizing medical schools of that time did not even want to try his methods, just as they do not want in our days to try counter-irritants which are so indispensable and obviously effective in the treatment of arthritis. It did and does not seem to them dignified and "scientific" enough, to use such simple methods of experience. They preferred to declare and still declare that there is no cure for arthritis, because these so-called empirical methods do not fit into their narrow and rigid system of theories. Many patients thus are discouraged unnecessarily, and often enough driven into the arms of lay-healers. (See the author's article: "Management of Arthritis in the Menopause." *The New York Physician*, July, 1943.)

Paracelsus also reported that he had learned from empirics how to break up gall stones and renal calculi into sand with vegetable and mineral drugs and thus to promote their elimination. This was confirmed later on by many practitioners (e. g. Hufeland), but has been ignored by modern scientific medicine, although the health resorts also achieved similar cures.

A new increase in the rationalistic approach to medicine occurred in the seventeenth century which was also called "the century of natural science." We may learn from this very fact that we are wrong to claim this privilege for our epoch alone. Physics and chemistry at that time were proclaimed as the dominant science, even for the treatment of the sick. The iatro-mathematic, iatro-physic and iatro-chemical medical schools of that century bear their names from it. At that time too, exactly as it happens today, they considered their methods of natural science as very progressive, exact and infallible, although they appear rather primitive to us. Fascinated by the new chemical discoveries of acids, alkalies and salts, they believed to be right in interpreting the obscure processes of the body in no other way than with their physical and chemical conceptions, just as we deal today with hormones, allergy, vitamins and minerals.

Modern historians of medicine (Neuburger, Honigmann, Sigerist, Castiglioni and others) do not rate very highly the scientific interpreta-

tion of the medicine of that time. "They had transferred the results of natural science in a precipitate superficial analogy upon physiologic and pathologic processes."

This criticism does not require much change to fit exactly many exaggerations and oversimplifications of the experimental medicine of our times.

A striking example is the up-to-date customary treatment of stomach diseases. The most frequent symptom is hyperacidity, often leading to ulcer. According to the laws of chemistry this condition is treated mainly with alkalies. Furthermore, according to similar reasoning, a bland milk-gruel diet is given. The results, as is known, are unsatisfactory.

Actually it is the hyperrationalistic approach which prevents a practical solution. Our medical predecessors 100 years ago, physicians like Johann Peter Frank or Hufeland were just as familiar with the neutralizing effect of alkalies and absorbent earths (magnesium, alumen, etc.). But they knew that this is not nearly enough. They recommended bitter tonics as indispensable in order to combat gastric atony and other neuro-muscular disturbances. Moreover they declared milk to be the greatest offender in this condition ("Milk weakens all functions" Sydenham). Meat and other solid proteins together with white bread and rice were prescribed instead. This is still true today, as this author together with other followers of Modern Constitutional Therapy have proved in many cases. (See case histories in the author's *Technik der Konstitutionstherapie*. Vienna, Berne, 1936). Even if we were not able to give satisfactory experimental explanations for these practical results, the latter are far more important than any theory.

Recently a middle-aged woman was treated for 5 months for severe chronic indigestion without any success at one of the most scientific hospitals of New York. It was finally declared that all the tests were normal and that the patient could not be helped, although she complained of pain, cramps of the stomach, nausea and lack of appetite. According to the present stylish trend of "phychosomatic medicine," she was advised to see a psychiatrist. As the patient consulted us for menopausal complaints, we found it necessary to regulate her digestion first. The milk-gruel diet was discarded and supplanted by a mixed diet, stressing meat and rice. Also bitter tonics were given. The stomach complaints disappeared within 2 weeks. This is just one example among thousands. It also shows that our tests very often are too coarse and clumsy to cover even severe subjective symptoms, an observation which is of principal importance at a time when laboratory and test-diagnosis is over-stressed, and clinical or symptom-diagnosis minimized and even distrusted.

In this connection Sydenham (seventeenth century) should be quoted. Significantly he was called "The English Hippocrates." He expressly declined to give theoretical explanations for the processes of life. He won an international clientel by his outstanding cures. His therapy was simple, emphasizing in a Hippocratic way the methods of elimination such as purging, sweating, vomiting and bleeding with, of course, refined individualizing modifications. He was criticized for not trying to penetrate deeper into the mysteries of diseases. He answered his adversaries by asking them to explain to him, why a horse needs seven years and man twenty-one years to become grown-up. Or why some herbs blossom in May, others in June. He said that he would have gained honor in the academic world, if he had published empty and useless speculations, but he would prefer direct practical observations to reasoning.

Again the analogy to our days is evident. All too often research specialists and "bedside-pathologists" are the teachers in medical schools instead of experienced and successful practitioners, a situation which was recently deplored by an outstanding American internist of Yale University.

The eighteenth century is representative of the combination of large-scale medical systems with newly discovered results of natural science. Boerhaave, Hoffmann and Stahl are the most outstanding exponents of this era.

As a clinical teacher and successful practitioner of international reputation Boerhaave renounced expressly any attempt to explain the ultimate causes of the processes in the body, because he was convinced "that all our attempts of explanation are only clumsy trials with still incompetent means, far remote from the truth, which hardly ever may be reached completely." Boerhaave and his followers excelled especially in effective methods of general treatment which we are neglecting today, e. g. the antiphlogistic treatment. Besides antiphlogistic diet, rest, "cooling" saline laxatives and carefully planned bleeding they possessed quite a number of chemotherapeutic agents for fever and inflammation such as saltpetre, acetic ammonia, ammonium chloride, tartaric salts, small doses of calomel and of antimonium tartrate. These remedies influence favorably the physical substrate in all kinds of acute and chronic infections and aseptic (endogenous) inflammations. Today we are proud of the discovery of the sulfa drugs and of penicillin, whereas their forerunners, still often effective in otherwise refractory cases, have been forgotten.

Stahl also condemned the incompetent and "frivolous" attempts, to explain all the processes in the human organism by mechanical and chemical analogies.

Hufeland, who was the physician of Goethe while he was at the University of Jena and later became director of the Charité Clinic of Berlin, is one of those masters of medicine who combined practical methods with a huge scientific, historical and philosophical background. His textbook *Encheiridion Medicum* which went through a number of editions during the first half of the nineteenth century still provides a gold mine of information for every modern physician.

Discussing in a special chapter the fate of such fundamental remedies in medicine as opium, emetics and venesection, he emphatically complained that the most established basic methods often are discarded by a stroke of the pen of ambitious scholars, inexperienced in the practical methods of tradition, to the infinite damage of mankind. Although he was the director of one of the most famous medical schools in Germany of that time, he cried out: "Oh holy nature keep us on the true way, indicated by thyself in our art and let us beware of the heresies and errors of the medical schools!" Also: "Must we not pity the fate of medical art which has been deprived of one of its most precious remedies by one track-mindedness, rage for innovation and sectarianism, and especially by contempt of practical experience."

In the middle of the 19th century the renewed interest in morbid anatomy resulted in skepticism and nihilism among the physicians. In 1840 the famous German clinician Wunderlich in Tuebingen had to admit that earlier physicians with all their alleged poverty of scientific knowledge were better practitioners than the "modern" physicians who were guided mainly by morbid anatomy. The rationalism of pathologic-anatomical origin had a paralyzing influence upon medical practice during the following era.

Skepticism and nihilism culminated in the "Younger Viennese School." Deeply impressed by the unusually rich stream of findings of the death-house of Vienna, the internist Skoda stressed mainly diagnosis and said that "nobody should hope to cure any internal disease, unless nature itself would cure it." Nobody would believe in the effect of internal treatment by drugs.

Scientific diagnosis, supported by the newly discovered methods of percussion and auscultation, and later on by laboratory tests, was all-important. Internal therapy with few exceptions was considered nearly a quantité negligeable. In the clinical lectures of the famous internists, even in the first decade of our century (Nothnagel, Friedrich Mueller, F. Kraus, Osler, etc.), nearly the whole hour was filled with scientific remarks on pathology and differential diagnosis. Treatment was dis-

cussed in the last five minutes, while the professor already "had his hat in his hand," being about to leave the auditorium.

A characteristic jokular saying circulating among the Viennese students of that time, pointed out that "that patient would be the most fortunate whose diagnosis was made by Skoda, whose operation was performed by Billroth and whose autopsy was done by Rokitansky."

Twentieth Century

We may well say that the extreme nihilism in internal medicine and its related branches such as neurology, psychiatry, pediatrics, dermatology has yielded to greater activity, spurred by the splendid progress in bacteriology, endocrinology, biochemistry and chemotherapy.

But there is still a great deal of paralyzing and even "destructive skepticism" (Sigerist), caused by an overemphasis of rationalism. Only such methods of diagnosis and therapy are considered desirable, which can be controlled by the laboratory experiment or by laboratory tests. But as we have pointed out before, not only is this an arbitrary yardstick, but it leaves aside the largest part of all the established and practical methods of treatment of the past.

Since 1924 this author has tried to point at this fact as the principal root of our present medical dilemma, advocating a synthesis between tradition and progress. But as yet this alarming situation is not recognized by the leaders of the medical profession. (Scientific evidence in the author's: *Die Konstitution der Frau*, Munich, 1924; and *Die Krise der Medicin; Konstitutions therapie als Ausweg*, Stuttgart, 1928; 7th edition, 1934.)

Just as in the last century morbid anatomy, in spite of all its merits, narrowed the horizon of the practising physicians, now another form of dogmatic rationalism has been exaggerated. Physiology and experimental medicine are now considered the guiding theories. Whenever a new method or a new doctrine has been discovered in this field, such as endocrinology, allergy, vitamins, minerals and basal metabolism, they have been and are still eagerly applied for interpretation and treatment of all possible diseases, whereas the most fundamental former established clinical conceptions and methods of healing have been swept away and sent into oblivion, as if they never had existed.

Psychiatry is such an example. Whereas until about 1920 extreme nihilism, fatalism and pessimism ruled in the mental clinics, where only sedatives and eventual rare spontaneous recovery were considered, a new

form of activity has set in, during the last decade. Psychotherapy and shock-treatment are all-important now. At the same time all the statistics point to the deplorable overcrowding of the mental institutions and the helplessness of the overworked psychiatrists, each of whom has to take care of 300-500 patients, an impossible task. Is there any way out? Of course there is. We must not restrict ourselves to the latest stylish treatment, but study also the traditional methods, as in any other art and science. From Hippocrates until Hufeland drastic laxatives, emetics and cold showers, including general constitutional treatment cured a majority of mental cases, especially in the early stages. This is still true today, and everyone who tries it, will be able to help considerably to evacuate the overcrowded institutions. (See the author's monograph: *Constitutional Therapy in Female Mental Diseases*, Stuttgart, 1933).

Surgery, on the other hand has conquered many districts which formerly were the uncontested domain of internal medicine, e. g. diseases of the stomach, the gall bladder, the kidney, as far as they were not malignant. Certainly the splendid progress in surgical technique cannot be praised too highly. But on the other hand the modern physician has forgotten how to treat effectively hyperacidity of the stomach with a tendency for ulcer, by conservative means. The result is that the surgeon has to cut out nearly four-fifths of the stomach in order to avoid a relapse of a small benign ulcer, an unnecessarily mutilating operation, which in itself is a monstrosity. Misguided rationalism, believing in alkalies and bland diet only, instead of the tonic treatment mentioned above, is to blame.

There are also situations where in the case of cholecystitis or gall stones surgical interference may be too risky, e. g. in case of old age, obesity, heart failure etc. Here the internist, using the practical methods of antiphlogosis, revulsion and elimination usually can avoid an operation.

The preponderance of technical and laboratory spirit over practical experience is also often misleading in my own special field, gynecology. Since the dawn of medicine the menstrual flow has been considered a rhythmic elimination, important for female health. On the other hand disturbances of this discharge, like suppression of any other regular elimination, have been counted among the most frequent causes of female pathology. (Statistics and numerous case histories in the author's *Klinik und Behandlung der Menstruationsstörungen*, Stuttgart, 1931.)

Today under the influence of exaggerated endocrinology, only the internal secretion of the ovary and the pituitary are considered, and the menstrual flow declared as unimportant—at best good for " psycho-

logical" reasons. Such an approach is not only superficial, inaccurate and utterly arbitrary, but also practically harmful. As we cannot establish the necessity of the menstrual flow by animal experiments, since the laboratory animals have no menstruation, this factor is simply discarded from the equation. Practically speaking, too rare and too scanty menstruation in younger women may provoke all kinds of metabolic disturbances and autointoxications such as osteo-arthritis, skin diseases, neuritis, neuralgia and even mental depression. We see the same thing in a certain percentage of women in the natural and still more in premature artificial menopause, even in cases where only the uterus has been removed and the ovaries left behind. Many women after hysterectomy, it is true, suffer no complaints for quite a number of years. But in others whose nervous, circulatory and endocrine system is less balanced, quite a host of very distressing symptoms such as high blood pressure, heart attacks, mental depression and severe chronic arthritis may result. This has been proved by long observation and is well known to internists, neurologists, arthritis specialists and to physicians practising in health resorts, more than to the average gynecologist, who usually follows up such patients for only a short time after operation and then refers them to the different specialists.

Dr. Epstein, head of the much frequented arthritis clinic at the Stuyvesant Polyclinic in New York, told this author expressly that he saw the severest and most refractory cases of osteo-arthritis in the artificial menopause.

Consequently, the gynecologist should make the greatest effort to preserve a regular and sufficient menstrual flow up to the age of the normal menopause whenever possible. In cases of fibroids conservative myomectomy can be performed in a majority of all cases, as this author together with others have demonstrated for many years. (*Centralblatt f. Gynaekologie*, 1932, No. 41.) I. C. Rubin (Mount Sinai Hospital, New York) on the basis of his own extensive statistics, recently confirmed the fact that such patients after conservative myomectomy, who have preserved a sufficient menstrual flow, are in much better general health than those who lost their menstruation.

Similar principles hold true for all branches of medicine. Everywhere onesided exaggerated "hyperscientific" and hyperexact rationalism, guided by morbid anatomy, solidar pathology, biochemistry and experimental pharmacology sooner or later, in spite of splendid partial success, lead to a blind alley.

It is not necessary that so many men die of heart attack (angina pectoris and coronary occlusion) at the early age of 45 to 55 years, very

often under the eyes of the best possible present-day medical care. If we consider only such experimental factors as hardening and spasms of the arteries, lack of oxygen and nervous stimuli, our approach is incomplete and our results will be unsatisfactory. If however, according to long experience and to the former system of humoral pathology, not only the solid wall of the heart and blood vessels but also its fluid content, the blood, is considered and treated, then the outlook becomes much more favorable. It is the blood which may provoke the spasms and thrombosis. Congestion and chemical alteration of the blood are other factors. Consequently, influencing the quality, quantity and distribution of the blood by the methods of alteration, revulsion and elimination improves the results considerably. Moreover, a large number of unused antispasmodic drugs such as ipecacuanha, Dover's powder, zinc oxyde, acetic ammonia, lobelia and others are very helpful in this condition where the customary remedies have failed.

We may recall similar statements concerning practical treatment of diseases of the stomach, the gall bladder, the kidney, the skin, the eyes and the ears and of mental diseases. Everywhere experimental medicine needs the completion of the medicine of experience. A " Comparative Therapy " of all times and nations for the different diseases would yield the most surprising and satisfactory results. The author tried that to a certain extent in his textbooks on Constitutional Therapy quoted above.

Finally another aspect is the social and economic side of medicine. Everyday practice, not to speak of unusual cases, has become so mechanized, dependent on gadgets, and complicated, that it is too expensive for most people. However the stressing of practical methods of treatment, e. g. in arthritis, mental and stomach diseases, would save an enormous amount of time, work and money.

Summing up, what we need urgently is completion of the narrowed and rigid hyperrationalistic experimental medicine by a strong, more flexible and tolerant practical trend, which takes useful therapy wherever it can be found. Its main sources can be recovered from traditional medicine of the last centuries.

In a review of a book of mine (*Bull. of the Hist. of Med.*, March, 1943), Dr. Sigerist gave credit to a more broad-minded approach to medicine. He also admitted that a synthesis between tradition and progress may yield unusual practical results. But he said that such surprising effects often sound " like miracle cures," and therefore are not convincing to the medical profession, that they should be bolstered by laboratory tests. However, as we have pointed out, it is often impossible

to fulfil this request, as our laboratory tests still do not cover many of the most important symptoms and healing effects. Such healing effects, if confirmed again and again by case reports, eventually by statistics, must be accepted as sufficient proof for the effectiveness of a therapeutic method.

Such views in recent years have often been called queer, old-fashioned or even revolutionary. We believe that a most comprehensive liberal approach to therapy, considering not only the patient as a whole, but also the useful part of the medicine of all times and nations as a whole, is the true Hippocratic way. It is, rather, heresy and sectarianism to believe only in that part of medicine which can be controlled by laboratory methods and to neglect the collected experience of humanity.

PLANT PHYSIOLOGY IN THE BIBLE

DAVID I. MACHT *

One of the most impressive characteristics of the Bible, to which I have repeatedly called attention in various publications, is the fact that all its allusions to natural phenomena and natural history, whether in the form of absolute statements of fact or in the form of metaphors, similes, parables or allegories, are literally as well as figuratively correct. This observation has impressed not only the writer but many other research scientists. Such being the extraordinary concordance between the dicta of the Scriptures and many of the recent discoveries in biological and physiochemical sciences, every student of the Bible will endorse Sir Isaac Newton's statement that "the Scriptures of God are the most sublime philosophy. I find more sure marks of authenticity in the Bible than in profane history anywhere." The present writer himself agrees entirely from his own experience with the declaration of the eminent American geographer and hydrographer, Matthew Fontaine Maury, "The Bible *is* authority for everything it touches. . . . The agents concerned in the physical economy of our planet are ministers of Him Who made both it and the Bible. The records which He has chosen to make through the agency of these ministers of His upon the crust of the earth are as true as the records which, by the hands of His prophets and servants, He has been pleased to make in the Book of Life."

I.

As a student of general physiology, the writer wishes to stress some striking passages in the Bible which bear upon botany and plant physiology. The Biblical story of the creation or cosmogony has been commented upon not only by religious writers but also by natural scientists and particularly by exponents of geology, that special science so widely misunderstood. In the strictly scientific sense of the word, the science of geology is a search for truth concerning the history of the earth and, as some of its expounders have pointed out, the order of creation as described in Genesis harmonizes very well with many of the facts now known concerning the early life of this planet. Here I wish to call attention only to the vital importance to all life on the earth of the phenomena of photosynthesis. Modern science has discovered that all vital activity,

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whether of animals or of planets, is finally traceable to the energy of solar radiations. Animals in general derive their nourishment from vegetables or, as in case of the carnivorous species, from devouring other beasts which, in the last analysis, subsist on vegetable food. This all important process of photosynthesis goes hand in hand with the activities of what is known as " leaf green " or chlorophyll, the green pigment found in the leaves of higher plants by virtue of which under the influence of the sun's rays simple compounds such as carbon dioxide are built into complex organic matter and by still further photosynthetic processes performed under the influence of the sun's rays, the special constituents of living creatures are built up.

It will be noted that in the description of creation in Genesis I (11-15), and so beautifully summarized by King David in Psalm CIV, which Alexander Humboldt denominated the most sublime of nature Psalms, grass and other verdure were created on the third day, immediately before the heavenly bodies and particularly the sun,

> And God said, Let the earth bring forth grass, the herb yielding seed, and the fruit tree yielding fruit after his kind, whose seed is in itself, upon the earth: and it was so.
>
> And the earth brought forth grass, and herb yielding seed after his kind, and the tree yielding fruit, whose seed was in itself, after his kind: and God saw that it was good.
>
> And the evening and the morning were the third day.
>
> And God said, Let there be lights in the firmament of the heaven to divide the day from the night; and let them be for signs, and for seasons, and for days, and for years:
>
> And let them be for lights in the firmament of the heaven to give light upon the earth: and it was so. . . .
>
> And the evening and the morning were the fourth day.
>
> And God said, Let the waters bring forth abundantly the moving creature that hath life, and fowl that may fly above the earth in the open firmament of heaven.

It was only after the sun's rays had been given an opportunity to initiate photosynthetic processes that animals were created because all animals depend upon the plant world for their subsistence.

The great importance of verdure or chlorophyll-containing plants is emphasized also in Genesis I (30),

> And to every beast of the earth, and to every fowl of the air, and to everything that creepeth upon the earth, wherein there is life, I have given *every green herb for meat*: and it was so.

Special emphasis is laid here on the Hebrew *yereq* and *esev*, the green leafage or constituent concerned in elaborating nutriment so essential for

sustenance of higher animals. The same thought is expressed in Genesis IX (3),

> Every moving thing that liveth shall be meat for you: even as the green herbs have I given you all things.

The dependence of human life upon the plant world is also stressed in Deuteronomy XX (19),

> When thou shalt besiege a city a long time, in making war against it to take it, thou shalt not destroy the trees thereof by forcing an axe against them, and thou shalt not cut them down (for *the tree of the field is man's life*) to employ them in the siege,

where wanton destruction of trees by man is forbidden. Sir Thomas Browne, quoting from Isaiah XL, declared, "'All flesh is grass' is not only metaphorically but literally true for all creatures which we behold are but the herbs of the field, digested into flesh in them, or more remotely carnified in ourselves."

II.

The Jewish philosopher, Bachya Ibn Pakuda (982-1057), in his "Duties of the Heart," claims that intelligent contemplation and study of nature direct our thoughts to the Creator, who not only established the physical laws but also gave to men moral and spiritual laws to distinguish them from merely physical organisms. Such thoughts are inspired by the Bible as a whole or by its respective books. Small wonder that Coulton in his recent volume entitled, "Medieval Panorama" (Macmillan, 1938), states that "the literary value of the Bible has been acknowledged by so many thinkers who would reject much of its dogmatic teaching, that no social history of England can be complete without some serious estimate of what the Book has brought into English life." A similar assertion could be made with regard to the Bible's scientific value, and the numerous Scriptural allusions to nature are, just as science itself, of universal interest and have influenced the lives of not only one but all civilized peoples. Coulton quotes, for instance, that immortal spring song of Solomon which has its own charm for every nation under the sun.

> For, lo, the winter is past,
> The rain is over and gone;
> The flowers appear on the earth,
> The time of the singing-birds is come,
> And the voice of the turtle is heard in our land. . . .
>
> Come, my beloved, let us go forth into the field,
> Let us lodge in the villages,

Let us get up early to the vineyards;
Let us see if the vine flourish,
Whether the tender grape appear
And the pomegranates bud forth.

The constant revival of verdure and the recurring life of plants and animals with their representative activities directed toward perpetuation of the species and even the unchanging cycle of water in nature (Eccl. I. 7),

All the rivers run into the sea; yet the sea is not full; unto the place from whence the rivers come, thither they return to go,

led Job to a conviction of man's immortality and survival after death (Job XIV. 1-14). To appreciate the significance of the text, a translation of which follows, we must remember that in classical Hebrew there are no punctuation marks and that a declarative statement such as "Man dieth and lieth low," may with equal propriety be rendered as a question thus, "Shall man die and lie low?" The constant renewal of nature and the perpetuation of organic and inorganic phenomena prove the absurdity of the mechanistic theory with regard to the dissolution of man in the face of a just and beneficent Creator.

Man that is born of woman, his days are few, and full of trouble.

He cometh forth like a flower and withereth; he fleeth as a shadow and continueth not.

And dost Thou open Thine eyes upon such an one, and bringest me into judgment with Thee?

Who can bring a clean thing out of an unclean? Not one.

Seeing his days are determined, the number of his moons with Thee, and Thou hast appointed his bounds that he cannot pass;

Look away from him, that he may rest, till he shall accomplish, as an hireling, his day.

For there is hope of a tree, if it be cut down, that it will sprout again, and that the tender branch thereof will not cease.

Though the root thereof wax old in the earth, and the stock thereof die in the ground:

Yet through the scent of water it will bud, and put forth boughs like a plant.

But now, shall man die and lie low? Yea, shall man perish? Then where is he?

As the waters fail from the sea, and the river is drawn dry, so shall man lie down and not rise up? and shall he not wake up till the heavens be no more?

Oh, that Thou wouldst hide me in the nether world of the departed; that Thou wouldst keep me secret until Thy wrath be past, that Thou wouldst appoint me a set time and remember me.

In the phenomena of photosynthesis several factors play an important role. In the first place, the source of energy is the sun. In the second place, synthesis of higher and more complex compounds from simple

substances requires the enzymatic action of the pigment chlorophyll, the chemical structure of which is now pretty well known. In the third place, all the higher plants by virtue of the chlorophyll in their leaves under the influence of the sun's rays absorb carbon dioxide and water and oxygen from the air and nitrogen, calcium and iron and other elements from the soil. The entire process of this complex phenomenon known as photosynthesis is beautifully employed by the prophet (Job VIII) to describe the steadfastness of his faith in God and in the Creator and to convey a message of consolation with regard to the perplexing problem of why the wicked so often prosper in this world while the righteous must endure all manner of suffering. Chapter VIII analyzes this philosophical and religious problem by employing vivid figures of speech and similes derived from the luxuriant semi-tropical vegetation of the Near East (See comments by Davidson and Lanchester on the Book of Job in the Cambridge Edition of the Bible).

III.

One of the most famous nature stories in the Bible is that which has to do with the dietary problem of Daniel and his companions (Dan. I. 11-16),

> Then said Daniel to Melzar. . . .
>
> Prove thy servants, I beseech thee, ten days; and let them give us pulse to eat, and water to drink.
>
> Then let our countenances be looked upon before thee, and the countenance of the children that eat of the portion of the king's meat: and as thou seest, deal with thy servants.
>
> So he consented to them in this matter, and proved them ten days.
>
> And at the end of ten days their countenances appeared fairer and fatter in flesh than all the children which did eat the portion of the king's meat.
>
> Thus Melzar took away the portion of their meat, and the wine that thou should drink; and gave them pulse.

For reasons that cannot be detailed here, Daniel and his comrades preferred not to eat the food offered them at Nebuchadnezzar's court (Macht: Dietary Laws. *Jewish Library of Leo Jung*. Vol. II). Instead Daniel asked permission to eat an abundance of *zer'onim*, a word aptly rendered in the A. V. as "pulse," which is a more accurate and suggestive translation than the word "vegetables" substituted in some later, fashionable translations by modern editors. By pulse are meant leguminous plants such as *beans and peas in their green pods*. Modern nutritional chemistry teaches us that it is possible to subsist on a purely vegetarian diet provided it contains such chlorophyll-rich ingredients as are found in the legumes. Years ago it was shown by McCollum, Simmonds and Pitz

(*Am. J. Physiol.*, 1916, XLI, 333), and later by many other biochemists, that a completely satisfactory nutritious ration can be obtained from a diet consisting entirely of green blades or leaves. Without such green leafage, rich in chlorophyll and vitamins produced under the influence of sunshine, a vegetarian diet would not be adequate and if maintained for a long time would lead to harmful changes in body and shortening of life. Daniel's choice of *zer'onim* appears to have been fortunate.

Another Biblical passage stressing the importance of verdure or green-leaved vegetation for perfect nutrition may be found in the Book of Numbers (XXII, 4), bent on persuading Balaam to curse Israel, pays that people an unintentional compliment by saying,

> Now shall this company lick up all round about us, as the ox licketh up the grass of the field.

" Have you had your alfalfa today? " is the title of an intriguing article by T. P. Lessing in a recent issue of the *Magazine Digest* (Toronto). The author tells how dehydrated grass has been found to be rich in food value, good to eat, and, in addition, beneficial as a medicament. Scientists have found that dehydrated ground grasses furnish a wealth of vitamins, in fact, twenty-eight times more vitamins per pound than dried foods and vegetables. Such properly selected grasses contain twenty-three times more vitamin A than carrots, nine times more vitamin B_1 than leafy green vegetables, twenty-two times more vitamin B_2 than lettuce, and fourteen times more vitamin C than tomatoes. In addition, there is in such grasses an important newly discovered vitamin K, which prevents bleeding. Beside all these vitamins, alfalfa, which properly speaking is not a grass but a leguminous plant, also contains starch, proteins and many minerals essentials to our diet (Hylander. *The World of Plant Life*, 1939). Small wonder that Balak and his hordes could not overcome a people devouring the green of the field instead of rich animal meats and fats.

IV.

In Deuteronomy XXXIII (14) is found the following clause, " And for the precious things of the yield of the moons." According to Haupt (*Am. J. Semitic Languages*, 26, 218), we must read, " By the precious fruit of the expulsion of the womb." It is interesting to note that Rabbi Samson R. Hirsch interprets th passage in the same sense though without emendation of the text, *Die Früchte, die an eine Zahl von Monaten Gebunden sind, welche durch eine Zahl aufeinander folgender Monate, gefördert werden; es sind dies die Leibesfrucht der Tierwelt* (Commentary to Deut.). Rashi, the leader of Hebrew exegetes, however, following the

traditional rendering, states in connection with this passage that there are fruits which are ripened especially *by the light of the moon.* This last comment is in striking agreement with experimental biological and biophysical work recently carried on by the present author and another investigator. (Macht: *Jour. Gen. Physiol.* 1926, X, 41-52.)

The influence of the moon on various phenomena of nature and more particularly on plant and animal life was believed in by many primitive peoples. Such popular beliefs and superstitions, of course, have been ridiculed by scientific men, yet no experimental proof to the contrary has been adduced. The significance of some of the earlier popular observations gain in interest when we remember that the illustrious physicists and astronomers, Huygens and later Arrago, demonstrated the fact, now generally known to physicists, that moonlight is rich in polarized light.

Some recent experimental work on the biological effects of polarized light has been found to elucidate the passage quoted above. Semmens (*Nature*, London, 1923, III, 49) found that the enzyme diastase changes starch granules into sugar more rapidly in polarized than in non-polarized light. These observations were confirmed by Macht, who found furthermore that the action of other enzymes is also influenced by polarized light. He also made a study of the influence of polarized light on microscopic plants and found that yeast plants multiply more rapidly in polarized light than in non-polarized light (*Proc. Soc. Exper. Biol. & Med.*, 1925, XXII, 471, 473, 474). Following such experiments, the author made a more extensive study of the biophysics of polarized light during fall and winter. A physically correct apparatus was constructed by means of which the comparative effects of polarized and non-polarized light could be carefully studied.

V.

To the superficial reader of Isaiah XL (6-7), the message of the Hebrew *nahamu* ("Comfort ye") appears paradoxical. Far from conveying a message of comfort and cheer, the prophet seems to voice disillusion and despair.

> A voice saith, Proclaim, And he said, What shall I proclaim? All flesh is as grass, and all the goodliness thereof is as the flower of the field.
>
> The grass withereth and the flower fadeth, when the breath of the LORD hath blown upon it. Verily the people is grass.
>
> The grass withereth, the flower fadeth, but the word of our God standeth forever.

What more ghastly picture of the inexorable laws of nature and the futility of life, yes, even of the goodliness and beauty of all human endeavor (to cap our mortification we read that this is true not only of individuals

but also of whole nations, " Verily the peoples are but grass." Nations rise and fall, are swept away and forgotten), could be expressed in such few words as these. Yet this famous passage is intended to bear a message of cheer and comfort, and the very name of God employed in the Hebrew text is intended to express His mercy and loving kindness in contrast to the ideology of God as the Judge and Creator of nature's unchanging laws.

The key to the whole passage is found in verse 8, where the mournful minor notes are but the prelude to a major and joyful chorus. The great advances made in the modern science of biology have emphasized the vast importance of two great laws of nature. One of these, expressed in the famous Latin phrase, *omne vivum ex vivo*, tells us that protoplasm comes only from antecedent protoplasm. Every kind of plant and animal originates from pre-existing individuals of its own kind, and life presents an unbroken chain from the " in the beginning " when the first living drop of protoplasm was created by the Almighty. This is the truth which was enunciated by the famous French scientist, Louis Pasteur (1822-95). Both in the plant kingdom and in the animal kingdom, generations come and generations go but rarely does the individual completely perish. In the normal course of nature, the germ plasm is transmitted from parent to offspring: and all of us have in our physical makeup the protoplasmic elements of the first man and woman. This is the second great law of nature, which modern biology has taught us through the science of genetics. The life of the father and mother is handed down to the son and daughter; and every part of their physical being, which has been wondrously developed from a single cell, contains in infinitesimal yet sufficient measure both the physical and spiritual characteristics of the parents. This, of course, is but a new version of the great law of *l'mino*, " after their kind," enunciated in the first chapter of Genesis. In both body and spirit our children are literally but part and parcel of ourselves.

The *blade* of grass may wither; the beauty of the flower, mostly expressed by its corolla, may fade, but the vital and essential elements of each are in the *seeds*, and these in normal healthy life survive and procreate and pass on their heritage. Natural history teaches us especially that seeds of plants may survive for generations, and even for centuries, and then with proper care, suitable environment and a sufficiency of light and moisture, may germinate and grow into healthy plants.

VI.

Although the flowering of trees and shrubs is not ordinarily included in the discussion of photosynthesis in the narrower sense of the word, inflorescence, of course, is intimately connected with growth and formation of fruits and thus becomes a part of that process universally essential for all forms of plant life. The Bible student who has some knowledge of plant physiology cannot but wonder at the message of cooperation and brotherly inculcated by the narrative in Numbers XVII (1-9),

> And the LORD spake unto Moses, saying,
>
> Speak unto the children of Israel, and take of every one of them a rod according to the house of their fathers, of all their princes according to the house of their fathers twelve rods: write thou every man's name upon his rod.
>
> And thou shalt write Aaron's name upon the rod of Levi: for one rod shall be for the head of their father.
>
> And thou shalt lay them up in the tabernacle of the congregation before the testimony, where I will meet with you.
>
> And it shall come to pass, that the man's rod, whom I shall choose, shall blossom: and I will make to cease from Me the murmurings of the children of Israel, whereby they murmur against you.
>
> And Moses spake unto the children of Israel, and every one of their princes gave him a rod apiece, for each prince one, according to their fathers' houses, even twelve rods: and the rod of Aaron was among their rods.
>
> And Moses laid up the rods before the LORD in the tabernacle of witness.
>
> And it came to pass, that on the morrow Moses went into the tabernacle of witness; and, behold, the rod of Aaron for the house of Levi was budded, and brought forth buds, and bloomed blossoms, and yielded almonds.
>
> And Moses brought out all the rods from before the LORD unto all the children of Israel: and they looked, and took every man his rod.

Botanists have long known that it is possible to induce roots to grow from the middle of the stem of certain plants (Nicol: *Plant Growth Substances*, 1938). Of recent years researches along these lines have shown that almost any one can make roots sprout on stems of a covered plant merely by painting it with something out of a bottle. The recent researches of plant physiologists have revealed the astonishingly potent properties of so-called growth-regulating substances, named phytoamines by some and aux-amines, or auxins, by others. These substances will cause roots to appear rapidly also on cuttings and we can now by using these growth-regulating chemicals likewise make plants grow better not only with regard to size but with regard to their several parts, whether they be roots or leaves or stems or flowers or fruit. The plant physiologist who is an ardent student of the Bible will without disparaging the trans-

cendentalism and miraculous aberration of nature described in the passage above admire the rhetorical figure in even greater measure in the light of this new knowledge concerning auxins. Indeed it will be that much more impressive and wonderful because of the exceptional behavior of Aaron's rod in contrast to those of the princes of the other tribes of Israel. The metaphor employed here, of course, is appropriate for the Holy Land, where almond trees are abundant and noted for their beauty. The flowers appear on these trees before the leaves and the branches are conspicuously covered early in the season with masses of large pink blossoms.

VII.

Psalm VIII is another nature psalm. Although unlike Psalm CIV, it is very brief, its few verses give a striking picture of heaven and earth and sea and all animate creation. The first and seventh verses are of special interest from the standpoint of modern botany. The habitual translation, "from the mouths of babes and sucklings," is not the only rendering permissible. According to classical Hebrew, the word *yoneq*, commonly translated "suckling" may with equal propriety be applied to a suckling babe or young animal or to a young and tender seedling, *yoneq* being also the word for "seedling" or "young plant." The Psalmist in this verse proclaims the wonders of creation as revealed through the mouths of young offspring, both baby animals and seedlings of plants. This metaphor is especially happy because according to botanical science the leaves of all higher plants contain on their lower side so-called *stomata*, meaning literally "mouths," which play a vital part in the physiology of the young plant. These mouths, operated by so-called guard cells, control the amount of water and the transpiration function of the plant, i. e., the absorption and evaporation of water through its vascular system and also the respiration of the seedling or plant involving absorption and elimination of various gases, oxygen and carbon dioxide, respectively.

A certain Semitic scholar states that the seventh verse of Psalm VIII may also very appropriately be rendered so as to include the entire host of animate creation, both fauna and flora. The Hebrew word *ba-hamoth*, denoting "cattle" or "beasts," is closely related to a cognate root in Arabic, meaning "to be mute" or "dumb," and this verse may well be translated as follows,

> Flocks and herds all together and the mute denizens of the fields

all proclaim the greatness of the Creator.

THE HUMOR OF JULIET'S NURSE

ANGELINA GUIDO

The widely recognized realism of the Nurse in *Romeo and Juliet* implies a clearly definable social status and also an inner truth-to-life in terms of Elizabethan psychology; but critics have systematically investigated neither her social nor her psychological background. Johnson, Steevens, Coleridge, Vischer, and Ulrici,[1] all agree on the Nurse's realism; but no such agreement exists on her position in society or her character: Clarke, for example, who says that the Nurse wants a "snug place, with its comforts of good feeding," and Taine, who describes her as "the mainstay of the kitchen, smelling of pots and old shoes," consider her a menial; but Gervinus calls her the "real mistress of the house." Hudson speaks of her "passiveness of mind,"[2] but Massey suggests that "she is prettily wise." Mrs. Jameson believes that she is "foolish," Helen F. Martin notices her "selfish nature,"[3] and S. A. Brooke regards her as "naughty";[4] but Staunton sees a "worthy old Nurse," and Keightley pictures her as a "jolly rubicund sort of woman." No one, however, ventures any proof, or attempts to sketch in her social background. No one questions her realism; but, indeed, how can the Nurse, who is described at once as servant and as mistress, as stupid and as wise, and as unworthy and as worthy, be truly realistic? Her biography, action, age, and social status, should lead up to a discussion of her psychology and her character.

The past life and the social status of the Nurse appear here and there clearly implied in the text. She had followed wet nursing as a profession,[5] and the Capulets had employed her as Juliet's "only nurse."[6] She might have left the household when Juliet was weaned at three years of age;[7] but she remained as Juliet's maid; and, after the death of her husband[8] and her daughter, Susan,[9] she was doubtless even more closely attached to the Capulets, and became a trusted, old retainer: when Lady Capulet wishes to speak privately to Juliet about marriage, she remem-

[1] *Romeo and Juliet*, ed. Furness Var., 130-299, see also 441 ff. My thanks are due to Professor John W. Draper of West Virginia University for assistance in this study.
[2] H. N. Hudson, *Shakespeare: His Life, Art, and Characters*, II, Boston, 1872, 222.
[3] Helen F. Martin, *Some of Shakespeare's Female Characters*, London, 1891, 125.
[4] S. A. Brooke, *On Ten Plays of Shakespeare*, New York, 1905, 46.
[5] I, iii, 60. [6] I, iii, 67. [7] I, iii, 20 ff. [8] I, iii, 39-40. [9] I, iii, 18-20.

bers the Nurse's position, and says, "thou's hear our counsel";[10] the Nurse acts at once as her confidente and her duenna. She declares herself Juliet's "drudge" to "toil" in her "delight."[11] She helps prepare for the dance where the lovers meet,[12] and later for the wedding.[13] In Arthur Broke's poem,[14] the Nurse is a comparatively minor figure: as in Shakespeare, she had a husband; she acts as a go-between for Romeo and Juliet; she gets the rope ladder; and she approves Romeo and later Paris as a lover; but, finally in Broke, because she kept Juliet's marriage a secret, she is banished; whereas Shakespeare lets her merely fade from the drama without comment. In Shakespeare, nevertheless, the Nurse's part on the whole is more important: he supplies her past with a child and an occupation; she acts as a go-between not only for Juliet and Romeo but also for Juliet and her parents.[15] Shakespeare has, moreover, given her talk a coarse raciness of style lacking in Broke; he uses both her conversation and her pragmatic view of marriage as a foil to the romantic lovers; and, in order to get Juliet to go to Friar Laurence for advice, he has the Nurse forsake Romeo's cause for that of Paris.[16]

The Nurse's age and social status require examination. The Elizabethans would have considered her *old*: she lacks "warm youthful blood";[17] she had had a daughter fourteen years before;[18] Mercutio addresses her as "ancient";[19] and she herself confesses that she has but four teeth left.[20] Elizabethans, however, because of neglected hygiene and bad teeth,[21] perforce called themselves *old* at forty;[22] and, since girls were commonly married in their teens, the Nurse need not have been even quite forty. Her garrulous temperament and her privileged position in the household, however, suggest a somewhat greater age; but not too much greater, or she would hardly have been an appropriate wet nurse for Juliet fourteen years before. The Nurse, in short, must have been about two score. Her social position is also important. The women attendants in Shakespeare seem to fall into two groups: those who, like Nerissa in *The Merchant of Venice* and like Maria in *Twelfth Night*, are *ladies*, and those who, like Emilia in *Othello*, only aspire to that enviable position.[23] The Nurse's conduct and speech imply that she belongs to the

[10] I, iii, 9 ff. [11] II, v, 74. [12] I, iv, 100. [13] IV, iv, 1 ff.
[14] Arthur Broke [Brooke], "The Tragicall Historye of Romeus and Juliet," *Shakespeare's Library*, Part 1, I, London, 1875, 75-204.
[15] I, iii, 1. [17] II, v, 12. [18] II, iv, 128.
[19] III, v, 239. [13] I, iii, 16-19. [20] I, iii, 13.
[21] John W. Draper, *The "Hamlet" of Shakespeare's Audiences*, Durham, 1938, note 38.
[22] *Ibid.*, note 39.
[23] John W. Draper, "Olivia's Household," *PMLA*, XLIX, 797 ff.

latter group: she accepts (though reluctantly) a tip from Romeo;[24] she speaks coarsely and blunderingly;[25] she is amazed at Friar Laurence's advice, and exclaims, "O, what learning is!";[26] and she boasts about Juliet's money.[27] When she appears with her fan, she suggests a pushing, overdressed woman who is trying to achieve gentility.[28] In spite of calling her "gentlewoman,"[29] Mercutio addresses her vulgarly; and Peter does not attempt to answer these jeers.[30] A lady, moreover, would not have been a professional wet nurse. She, therefore, could not have been well-born.

According to the Galenic theory, which had dominated both learned and popular medicine for a thousand years, four fluids known as "humors" governed the human physique. Each of these humors was associated with certain planets and constellations, with a season of the year, with a certain day and with certain hours. Perfect health was a proper balance of these humors, but most people had a superabundance of one of them. A sanguine person, with a predominance of blood, which was generated in the stomach, was considered hot and moist, handsome, and fortunate, and was characteristically a youth and a nobleman. A phlegmatic person, with a predominance of phlegm, which was generated in the liver, was considered cold and moist, effeminate, fat, and somewhat fortunate, and was associated with middle age, women and children. A choleric person, with a predominance of yellow bile, which was generated in the heart and stored in the gall bladder, was considered hot and dry, red-headed, bold, and unfortunate, and was associated with youth and middle age, with rulers, warriors and the like. A melancholy person, with a predominance of black bile, which was generated in the brain and stored in the spleen, was considered cold and dry, lean, crooked and very unfortunate, and was associated with old age and winter. The mercurial complexion, which was astrological rather than humoral, was unstable. The temperament of such persons depended on their environment; but it was, like melancholy, cold and dry. This constitution belonged to servants, entertainers, merchants. Even in his early plays, Shakespeare used the humors.[31] In *Romeo and Juliet* particularly, he employed not only humors but also astrology to motivate the very plot; the choleric Juliet and her sanguine lover are unable to defy the stars, and so meet a tragic fate.[32]

[24] II, iv, 165 ff. [25] II, iv, 153. [26] III, iii, 160.
[27] I, v, 114-5. [28] II, iv, 94. [29] II, iv, 98 ff. [30] II, iv, 140.
[31] John W. Draper, *The Humors and Shakespeare's Characters*, Durham, 1944.
[32] John W. Draper, "Shakespeare's Star-Crossed Lovers," *The Review of English Studies*, XV, 16-34.

In Broke, the humor of the Nurse is a complex problem. Her sex should make her phlegmatic. Embroiderers, moreover, possessed this temperament;[33] and she taught Juliet how to "sow, and how to spin with silke."[34] Her age should make her melancholy: she is described as "auncient," "olde dame" and "Beldam"; she "list[s] to toye";[35] she speaks to Romeo of "you yong men" and of her "many yeres"; and she is "banisht in her age."[36] Melancholy persons, moreover, were "crooked";[37] and the Nurse has "crooked knees."[38] They were inclined to be "obstinate in opinion,"[39] and she is "froward."[40] They were "rauenous" and "couetous";[41] and, when "at length, with promest hyre"[42] she pledges to act as Juliet's messenger, and also, when she approves of Romeo, the Nurse reveals her love for "glittring gold."[43] Her position as a servant should make her mercurial; and a "go-between in love-affairs"[44] was supposed to belong to this cast; and she is a go-between for Romeo and Juliet. Mercurial persons were also "volatile";[45] and she is called the "prating noorse."[46] Mercurial persons were "crafty,"[47] and she speaks of her "crafty wit."[48] They were "inconstant";[49] and she first praises Romeo as a lover, and then later lauds Paris "ten times more."[50] As a woman, in short, the Nurse, in her younger days when she taught Juliet fine sewing, must have been phlegmatic; but this temperament, as one would expect, in her later years in drying into melancholy—a humor that accords with the cold, dry mercurial complexion of the servant class. Thus the chill, wet phlegm of her sex has given place to the cold and dry of the mercurial and of the melancholy tempers. These last two easily combine; and, indeed, mercurial persons were subject to "all melancholy diseases."[51]

Shakespeare adds greatly to the meager physical evidence given by Broke and somewhat even to his ampler psychological materials. In the play, the Nurse at first sight seems to partake of all the humors. Like sanguine persons, who experienced "head-ach" and "passions of the backbone,"[52] the Nurse, when she returns from seeing Romeo, complains

[33] C. Dariot, *Iudgement of the Starres*, tr. Wither, London, 1598, sig. D_4 r.
[34] Broke, *op. cit.*, 90.
[35] *Ibid.*, 104.
[36] *Ibid.*, 203.
[37] Dariot, *op. cit.*, sig. D_2 r.
[38] Broke, 104.
[39] Dariot, sig. D_2 r.
[40] Broke, 102.
[41] Dariot, sig. D_3 r.
[42] Broke, 102.
[43] *Ibid.*, 105.
[44] N. E. D., *s. mercury.*
[45] *Ibid.*, *s. mercurial.*
[46] Broke, 103.
[47] Dariot, sig. E_2 r.
[48] Broke, 103.
[49] Dariot, sig. D_4 v.
[50] Broke, 174.
[51] Dariot, sig. E_2 r.
[52] *Ibid.*, sig. D_3 v.

that her "head aches,"[53] and wails, "O, my back, my back."[54] Like phlegmatic persons, who were luxury-loving,[55] she desires to be considered a lady: when she approaches the gallants, she trys to assume gentility, and requests, "My fan, Peter."; [56] and, when Romeo offers her money, she hesitates to accept it.[57] Like choleric persons, who were "fierie" and "yrefull,"[58] the Nurse displays an irritable temper: when Capulet becomes outraged at Juliet's refusal to marry Paris, the Nurse also becomes angry, and declares, "You are to blame, my lord, to rate her so."; [59] and, when the nurse meets the gallants at "noon," she becomes "so vexed that every part about [her] . . . quivers."[60] Like melancholy persons, who were "crooked"; she is "lame"; [61] and the Nurse is not beautiful: her "fan's . . . fairer"[62] than her face. Melancholy persons had bad teeth,[63] and she confesses that she has but "four" left. Juliet laments the Nurse's delay, and associates her with this humor and with the metal lead:

> . . . old folks, many feign as they were dead;
> Unwieldy, slow, heavy and pale as lead.[64]

Melancholy diseases infected the "bones"; [65] and the Nurse's "bones ache."[66]

At first sight this combination of all the humors would seem to imply a hopeless inconsistency. It might, however, be that fine balance that went with the perfect man; but the Nurse is hardly perfect. The last possibility is she may be mercurial; indeed, like mercurial persons who were "go-betweens in love affairs," the Nurse is a go-between for Romeo and Juliet. Such persons were "volatile" and talkative; and on occasion she even delays the action of the play with her everlasting chatter: Capulet calls her a "mumbling fool,"[67] and bids her "hold your tongue"; [68] and Lady Capulet tells her to "hold thy peace."[69] Mercurial persons had a "memory,"[70] and, in her opening speech, which should give a clue to her personality, the Nurse brags about her memory, and declares, "I do bear a brain."[71] Mercurial persons were "inconstant": [72] and, when she learns that Capulet wishes Juliet to marry Paris,

[53] II, v, 47.
[54] II, v, 49.
[55] Dariot, sig. D_6 r.
[56] II, iv, 94.
[57] II, iv, 165-7.
[58] Dariot, D_3 r.
[59] III, v, 168.
[60] II, iv, 145.
[61] II, v, 4.
[62] II, iv, 96.
[63] Dariot, sig. D_3 r.
[64] II, v, 15-16.
[65] Dariot, sig. D_3 r.
[66] II, v, 26.
[67] III, v, 72.
[68] III, v, 169.
[69] I, iii, 50.
[70] Dariot, sig. D_6 v.
[71] I, iii, 29.
[72] Dariot, sig. D_6 v.

she calls the Count a " man of wax " [73] and a " very flower "; [74] but later, when Juliet falls in love, the Nurse approves Romeo, and describes him as " handsome and . . . virtuous " [75] and " gentle as a lamb "; [76] then finally, when she realizes that her master is determined, she advises Juliet to accept Paris, calls him a " lovely gentleman," and remarks that " Romeo's a dishclout to him." [77] Mercurial persons sometimes lose their " common sense " [78] and, when she encourages the affair with Romeo, although she knows that Capulet has other plans for Juliet's marriage, she is not using good judgment. The Nurse, in short, appears to have clear mercurial traits; and, furthermore, the traces of the other humors that she shows would seem more or less to arise from their appearance in those about her at the time, and so provide further proof for her mercurial temperament; for " instable " [79] children of mercury were prone to reflect the humor of others. She complains of sanguine ailments; and, since she has just returned from seeing Romeo, who is sanguine, the Nurse might well have assumed his temper. Like phlegmatic persons, she possesses a love for luxury; but mercurial persons were " proud "; [80] and the Nurse's desire to be considered well-born suggests this trait. She displays a fiery temperament: her rebellious attitude in the presence of Capulet, who is choleric, may again be due to the instability of mercurial persons; and, when she becomes vexed at " noon," that choleric time of day [81] may well account for it. She seems to suffer from melancholy ailments; but mercurial persons were subject to " all melancholy diseases "; and, since both complexions were cold and dry, they were closely allied. Like Broke's Nurse, the cold, wet phlegm of her sex has given place to the cold and dry of the mercurial temperament; but Shakespeare's Nurse, however, appears to be younger, and, therefore, would not be as melancholy. Instead, she seems to be purely of the mercurial complexion. She is a " go-between in love affairs," " volatile " and very talkative. She has an unusual memory. She is " inconstant," and shows evidence of " depriuation of common sence "; and she is " instable," and reflects the humors of those around her.

Shakespeare's Nurse appears to have definite psychological traits that suggest the mercurial temperament. While the Nurse in the poem complains only of melancholy ailments, Shakespeare's Nurse also suffers from sanguine diseases, and displays a fiery, choleric temper. Thus, instead

[73] I, iii, 76. [74] II, v, 55-56. [75] III, v, 218-9. [76] *Ibid.*
[77] I, iii, 78. [78] II, v, 43. [79] Dariot, sig. D$_4$ v. [80] *Ibid.*
[81] Draper, " Star-Crossed Lovers," *cit. supra.*

of suggesting melancholy as in the source, her physical characteristics seem to point to the mercurial temperament. Her social status, moreover, agrees with this complexion. Although she enjoys a high position in the household and although she is addressed as an equal because of accustomed intimacy, she is not well-born. Her crude speech, her former profession as a wet nurse and the disrespect that the gallants show her, suggest that she is not a lady. Her position in society and her occupation, therefore, fit the mercurial complexion; for mercurial persons were servants. The Nurse appears to be about forty years old; and this age also seems appropriate for a cold, dry, mercurial person. In the play, her action is generally similar to that in the poem: she is Juliet's wet nurse and an old retainer; she is a go-between for the lovers; she gets the rope ladder; and she approves Romeo and then Paris. On the other hand, Shakespeare makes some notable changes. In Broke she is finally banished, but Shakespeare lets the Nurse fade from the tragedy. In the play, moreover, she is a go-between for Juliet and her parents; and she has a coarse raciness of style, lacking in Broke. The changes in the Nurse's character give unity to Shakespeare's play. By having her inform each of the lovers of the other's identity, Shakespeare reveals to the audience the thoughts of the lovers; and, by portraying her as a go-between for Juliet and her parents, and by letting her inform Juliet of Tybalt's death, he also more closely relates the incidents of the plot. When she denounces Romeo, moreover, and praises Paris, the Nurse gives Juliet a motive for going to Friar Laurence, who advises her to take the drug. Broke's Nurse is faintly limned; but Shakespeare develops her into a lifelike personality. Her chatter about the earthquake, the fan incident, her anger at Capulet and similar vivid details, which seem to account for the critics' agreeing on her realism, may have led Keightley to state that the Nurse is the "nearest thing in Shakespeare to a direct borrowing from mere observation."

JOSEPH LAKANAL

From Marcus, *Lakanal*, Paris, n. d.

TEXTS AND DOCUMENTS

THE RELATIONSHIP BETWEEN GEOFFROY SAINT-HILAIRE AND LAKANAL

OWSEI TEMKIN AND C. LILIAN TEMKIN *

Dr. William L. Straus, Jr., of Baltimore, Md., has kindly lent us a letter from Étienne Geoffroy Saint-Hilaire to Joseph Lakanal which to the best of our knowledge has never been published. Another letter from Geoffroy Saint-Hilaire to Lakanal which forms a logical sequence to Dr. Straus' letter was published in Marcus' biography of Lakanal.[1] We thought it worth while to present an English translation of both letters in the framework of a short sketch of the lives of Geoffroy Saint-Hilaire and Lakanal.

Lakanal, who was born in Serres, Department of Ariège, on July 14, 1761, was destined for the Church and received his education at a college of the Oratorians. Having finished his education, he was entrusted with several teaching positions in grammar, rhetoric and philosophy. It is probable that he also joined the Church,[2] but he became estranged from it and, in 1793, we find him a member of the National Convention to which he had been sent by the people of Ariège. From the very beginning Lakanal had one supreme aim: to protect the arts and sciences from "vandalism"[3] and to further the cultural institutions of France to the best of his ability. He even risked his own life in protecting eminent scholars and scientists. Once his name was put on the list of proscriptions but Marat himself said, "This name should be effaced; Lakanal thinks only of the sciences. He is not a conspirator."[4] One of the great tasks which Lakanal achieved for French science was the reform of the Jardin des plantes, and in this connection we find him the firm protector of the young Geoffroy St.-Hilaire.

Due to the endeavor of Guy de la Brosse, his physician-in-ordinary,

* Read before the Johns Hopkins Medical History Club on February 19, 1945.

[1] Cf. Marcus (6) pp. 144-147.

[2] Most biographers of Lakanal deny that he ever took orders. However, Le Gendre (5) p. 13 f., takes an opposite view, and it is interesting to note that in Dr. Straus' letter, Geoffroy St.-Hilaire refers to his friend as "monsieur l'ancient grand-vicaire d'évêque."

[3] Mignet (7) p. 5: "Cette ignorante et systématique fureur des barbares nouveaux, à laquelle il [i. e. Lakanal] ne craignait pas de donner le nom de vandalisme."

[4] Isidore Geoffroy St.-Hilaire (2) p. 17.

Louis XIII, in 1635, created the Jardin royal des plantes médicinales, under which name it was opened to the public in 1640.[5] As the name indicates, it was originally a school of pharmacy, but gradually its functions broadened and the attribute " médicinales " was dropped. In 1732, it was put under the direction of Cysternay du Fay, a member of the Academy of Sciences. His successor was Buffon who gave the establishment international fame. In 1790, after the outbreak of the French Revolution, the officers of the Jardin des plantes pressed the National Assembly for a reform which would change the Jardin des plantes into a museum of natural history. But at first nothing happened and, in 1793, the very existence of the Jardin des plantes was threatened when the Paris Commune wanted to make a potato field out of this royal foundation.[6] At this moment Lakanal stepped in. On June 10, 1793, he presented reform plans to the Convention and on the same day he had a law passed which established the Museum of Natural History and gave Geoffroy St.-Hilaire one of the twelve chairs established at the Museum.

Geoffroy St.-Hilaire was then 21 years old (he was born in Étampes on April 15, 1772). He had just been made " sous-garde et sous-démonstrateur du Cabinet d'histoire naturelle." [7] He had been a pupil of the famous mineralogist Haüy, but the law of June 10 suddenly made him professor of zoology. Small wonder then that there was opposition to having such a young and inexperienced man entrusted with so responsible a task. But Lakanal remained firm and Geoffroy St.-Hilaire remained professor of zoology.[8] Geoffroy St.-Hilaire never forgot his indebtedness to Lakanal and he alludes to it in his letters.

The Museum lacked one very important facility for the study of zoology, viz., a menagerie. But very soon an opportunity offered itself to Geoffroy St.-Hilaire: " On November 4, 1793, Geoffroy St.-Hilaire in the calm of his study was devoting himself to some research in natural history when he was brought very unexpected news. Several quadrupeds, a white bear, a female panther and other animals were at the door of the Museum. Soon another white bear and two mandrills, then an ocelot, several other quadrupeds and two eagles arrived in their turn. All these animals were sent to the Museum by the Police Department. It had decided the day before that in future no exhibition of living animals should be permitted in Paris and that three traveling menageries then in the city should be

[5] Cf. Isidore Geoffroy St.-Hilaire (3) p. 29 ff.
[6] Cf. Mignet (7) p. 7 f.
[7] Isidore Geoffroy St.-Hilaire (3) p. 22.
[8] Cf. *ibid.*, p. 24.

seized. It was these three menageries which had just arrived. The first announcement was the receipt by the Museum of the animals themselves, which were escorted by the dispossessed owners claiming the indemnities promised by the same ordinance as had affected them." The Museum as a national institution was not obliged to submit to a police order, but Geoffroy St.-Hilaire, instead of objecting, saw the opportunity offered to the institution. " He accepted the animals and all the difficulties which this acceptance involved were provisionally solved in a few moments. There was neither locale, nor guards, nor money: he provided for everything. He had the cages placed side by side under the windows in the courtyard of the Museum—this was the first menagerie. As guards he retained the owners of the animals themselves who by the seizure had been deprived of their means of existence. As for the food for the animals and the maintenance of their guards, he took it upon himself to provide for them until regular provision should be made." [9] Geoffroy St.-Hilaire's bold step was eventually supported by all his colleagues and again Lakanal stepped in to obtain the support of the government. Through his unceasing efforts on behalf of the Museum he became recognized as its second founder.[10]

In the following years a different fate awaited Geoffroy St.-Hilaire and Lakanal. The former's promise as a zoologist was realized. He participated as a scientist in Napoleon's expedition to Egypt and from year to year his fame grew as the most outstanding French zoologist except Cuvier. Lakanal, on the other hand, stood and fell with the Revolution. Some of the greatest educational and cultural achievements of the Convention and of the Directory were directly or indirectly due to him: the reorganization of primary and secondary schools, the establishment of the Écoles normales, of the School of Living Oriental Languages and of the Bureau of Longitudes and finally the creation of the Institute by Daunou, an achievement made possible by Lakanal's preparatory endeavors.[11] With all this, ardent revolutionary as he was, Lakanal kept his hands clean. When the Convention sent him on a mission to the departments of the south he reported: " I have established an arms factory in Bergerac, a depot of 4000 horses near the same town and I have not ordered anyone's arrest." [12] But with the ascendancy of Napoleon his star declined. He who had been president of the Commission of Public Instruction,

[9] *Ibid.*, p. 48 f.
[10] Cf. *ibid.*, p. 50 f.
[11] Cf. Lakanal (4), and Isidore Geoffroy St.-Hilaire (2) pp. 12 and 24
[12] Isidore Geoffroy St.-Hilaire (2) p. 19.

obtained a chair of ancient languages in one of the Écoles centrales. In 1804, he became one of the administrators of the Lycée Bonaparte and, in 1809, Inspector General of Weights and Measures. When the Bourbons returned he lost everything and after Waterloo he felt compelled to leave France and emigrate to the United States. He was well received by Thomas Jefferson. He became president of the University of New Orleans and in 1825 he left his post to settle down as a planter on Mobile Bay in Alabama. He was then 63 years old and intended never to return to France. But in 1830 he received news of the revolution in Paris and everything seemed changed.

The year 1830 was eventful for Geoffroy St.-Hilaire too. In this year his famous debate with Cuvier took place and in this year also he performed one of the noblest deeds of his life. When the July revolution came, Geoffroy St.-Hilaire welcomed it, but he, like his old friend Lakanal, abhorred all bloody excesses and this abhorrence led him to save the life of de Quélen, Archbishop of Paris, with whom he had no personal relations but who was threatened by the revolution. Again we may quote the account in the words of his son: " Saved for the first time at Conflans by the devotion of his physician, M. Caillard, and now hidden at the Pitié Hospital by M. Serres, the prelate whose trail had been followed again, found himself in danger. Geoffroy St.-Hilaire came and offered either to conduct him in disguise to one of his friends in Étampes or to take him into his own home. ' Count on me,' he said to M. Serres in terms whose utter simplicity makes them only the more worthy of being cited, ' turn him over to me. You know that I am used to this sort of thing.' On the 30th [i. e. July 30, 1830] M. de Quélen still hesitated; but on the 31st the imminence of the danger decided him. A hostile group had formed under his very windows and the most threatening words had been uttered. It was no longer possible to think of leaving Paris; but at nightfall the Archbishop in disguise gained the street by a back door, succeeded in reaching the residence of Geoffroy St.-Hilaire and entered, almost certain of not having been recognized. Indeed, nothing disturbed him in this asylum where until order was completely reestablished he lived calmly resigned, comforting himself in the thought that if misfortune takes away friends, it sometimes also gives us some. The Archbishop of Paris left the Jardin des plantes on August 14, a date already memorable for Geoffroy St.-Hilaire. It was on August 14, 38 years earlier, that he had run to the prison of the Abbé Haüy, bearing the order for his release." [18] Dr. Straus' letter alludes to the events of 1830,

[18] Isidore Geoffroy St.-Hilaire (3) p. 390 f.

since a few years later an opportunity arose to offer the room once occupied by the Archbishop of Paris to the returning Lakanal.

In 1830, Lakanal's hopes for an honorable return to France had been high. He had immediately offered his services to the new government—but had not even received a reply. When, in 1832, the Academy of Moral Sciences of which Lakanal had been a member and, which had been suppressed by Napoleon and the Restoration, was reorganized, Lakanal was not amongst those reinstated. Only in 1834, on March 22, due to the efforts of Geoffroy St.-Hilaire,[14] did the members of the Academy vote unanimously to restore Lakanal to his seat. "Now," Lakanal wrote to Geoffroy St.-Hilaire in August, 1834, "I can return, for *I shall return through the portal of honor.*" [15] This expression occurs in the following letter (Dr. Straus') which was written on November 29, 1834,[16] at a time when Lakanal was preparing to return.

The letter is addressed as follows:

To Monsieur
Monsieur Lakanal

Former Member of the Convention, for the last 19 years a French refugee in the free land of North America, in Mobile: To be delivered to him on his passage through Le Havre.

The contents of the letter read:

Monsieur, dear and honored Colleague,

I believe you to be on the ocean: thus have M. Jevelt and I calculated. You have sold your property in Mobile and you are returning to us, through the portal of *honor*.

I have been careful to have this put into the Constitutionnel of November ; I wished your return to be announced as a happy advent and virtuous rehabilitation.

As for myself, I am in addition working on a theme for you which, for French feelings, presents a great and just integration. I am finishing a work in natural history in quarto—the highest point to which I have been able to attain in the sciences through a discovery far-reaching enough to make me utter the challenge: *aut totum aut nihil*! All or nothing!

[14] Cf. Mignet (7) p. 28.

[15] Isidore Geoffroy St.-Hilaire (2) p. 30.

[16] The letter bears no year, but 1834 seems certain because of the reference to 19 years of exile in its address, and because the *Études progressives d'un naturaliste pendant les années 1834 et 1835* (1) obviously was the work on which Geoffroy St.-Hilaire was then engaged.

Well, I close this work with a section in which I show that six eminent men have guided the fortune of the royal garden: 1st, Guy de la Brosse, the first founder. 2nd, Buffon, the second founder. 3rd, ——— Lakanal (10th June, 1793) Cuvier who reestablished it. 4th, *Thiers*, who gave millions and enlarged the garden, etc. etc.—I let you guess the rest.

But what I beg you to give most attention to is that I have a large family, my three women-folk, my son and my son-in-law and, to crown all, a granddaughter too, and that we all await you with big feelings of gratitude. Besides, I have a tiny room [which] in the days of glory and of happiness for me and for France, I sanctified with archiepiscopal masses as the asylum of a man on whose head a price was set. In political and religious opinions we were poles apart. The Archbishop of Paris spent a fortnight in this little room, untouched by events since that time. This room awaits you: it is offered to you for a similar period; with this difference, that we shall all sympathize with you and shall only be paying the debt of friendship. Be well advised of this, former Grand-Vicar of a bishop! Come to us, to our hearts, without ceremony—to be treated likewise.

Farewell,

Very cordially

Geoffroy S. Hilaire

29th November

But Lakanal did not return in 1834. It was only three years later that he landed in Bordeaux, almost forgotten in the meantime, and when he arrived in Paris Geoffroy St.-Hilaire was not even in the city to welcome him but was away in Normandy occupied with paleontological research. Fortunately the letter in which he welcomed his old friend was published by Marcus [17] and from this letter we learn incidentally that Lakanal did not make use of Geoffroy St.-Hilaire's invitation to stay at his house—if indeed he had ever received the letter bearing the invitation at all.

Bernay Sunday, 16th September, 1837.

O, what a happy day for me! You are in Paris! Honorable friend, you who were my benefactor at the dawn of my life, are given back to me at last in the winter of my years!

Is there not a great singer of canticles, St. Simeon, who, satisfied

[17] Cf. footnote 1.

that he had fulfilled the conditions of the banquet of life, began to shout his joy and satisfaction? Today I am playing St. Simeon; et sic conviva satur! I come to tell the master of things: I can now don my last shirt of stone, that dwellingplace which the wickedness of men denies to none, but which I have already acquired and had made somewhere—acquired at the cost of money.

But at last, you, my worthy master, you in Paris! I say with joyous heart, with rapture: ego vidi salutare meum.

My wife and daughter had gone out and my son was at the criminal court as a juryman, when you appeared in this garden which you founded under the title of fourth restorer. Your associates in this benefaction are 1st, Gui de Labrosse, 2nd, Fagon, 3rd, Buffon, 4th . . . , 5th, Cuvier, 6th, Thiers, 7th, etc. . . .

I have a book which I sent to your America to you, but which the bearer has perhaps appropriated for his own benefit, which it is in my heart to bring to you on my first visit and in which I gave myself the pleasure of extolling the Gods of the Museum of Natural History.

M. Lhotte, as I beg him, will send your address to my home in Paris so that, on my return from Normandy where I am staying, I may be able to fly to your arms. With however much dispatch I apply myself, this can only be towards the end of the week; at least, I am certain to be at my dominical soirée on Sunday, a week from today. And how much I shall appreciate being able to present you to my friends who meet that day.

Last Sunday, so my daughter has written me, one of them clapped his hands at your name and the news of your arrival: it was David, our great sculptor, our colleague at the Institute, the grandson-in-law of Lareveillère-Lepaux. He has delighted in making his pantheon of great men, 300 medallions from the beautiful illustrations of his time, and in which he is anxious to place yours.

At Paris they torment me about the fossil bones, on the vain pretext of honoring Cuvier. I am away in order to describe here a crocodilian of the oothic [sic] region; it is an animal which lived a thousand million years B. C.

In truth, I begin to believe, with all my attentions and devotion to this completely saturnine old man, that I cannot live with sufficient elbow-room within the solar system: it no longer suffices for the satisfaction of my views and my researches. I escape from it imperceptibly to stay in other abysses which I name and deal with in my own way under the name of intra-stellar spaces.

I am reserving it for myself to talk to you about my species,

unknown before me in our European world and, perhaps, also in the American world that you have just left in our favor.

Why cannot I extricate myself from the oolithic region where I go to greet my crocodilian born a thousand million years B. C., and reborn two years ago for the satisfaction of your humble servant?

I am anxious to change my saturnine thoughts for a completely fresh antiquity, the antiquity which gives back to me after 40 years the heart of a great friend whom I am in haste to go and embrace. No more ocean between us!

Yours from my heart and soul,

Geoffroy Saint-Hilaire.

I am going today from Bernay to Caen, native land of the old crocodilian.[18]

Both letters refer to a publication by Geoffroy St.-Hilaire to which he apparently attributed great value. This publication can be identified as his *Études progressives d'un naturaliste pendant les années 1834 et 1835.* Paris, 1835. Apart from several scientific memoires it also contains a short outline of the history of the Jardin des plantes[19] and a long essay entitled:

LOI UNIVERSELLE
(Attraction de soi pour soi)
ou
Clef applicable a l'interprétation de tous les phénomènes de philosophie naturelle;

Découverte faite à la suite d'études incessantes concernant les arrangements, les complications, les mouvements, et généralement toutes les actions des êtres organisés.[20]

[18] Isidore Geoffroy St.-Hilaire (3) in the bibliography of his father mentions on p. 445 the following publication which may possibly embody the research referred to: "De quelques contemporains des Crocodiles fossiles des âges antédiluviens, d'un rang classique jusqu'alors indéterminé. *Ibid.* [i.e. Compt. rend. de l'Acad. des Sc.], VII, 629; 1838. Note sur les fossiles nommés *Thylacotherium* et *Cheirotherium.*"

[19] On p. 9 of this work (1), Geoffroy St.-Hilaire gives the following "Tableau *des phases du Muséum*":

1. Sa fondation.	Gui de la Brosse.
2. Sa régénération.	Fagon.
3. Sa grande et subite extension.	Buffon.
4. Sa conception unitaire.	Lakanal.
5. Son accroissement, en nombre et savoir.	Cuvier.
6. Sa magnificence en bâtiments.	Thiers.
7. Sa portée philosophique dans l'avenir.	.....

[20] *Ibid.*, p. 125.

This essay represents a violent attack on vitalism and teleological concepts in biology. Instead Geoffroy St.-Hilaire thinks that biological phenomena can be explained by assuming some sort of affinity between molecules of the same kind. This is the "attraction de soi pour soi" and represents the discovery which made him utter the challenge "all or nothing!" [21]

Geoffroy St.-Hilaire and Lakanal remained firm friends until death parted them. When Geoffroy St.-Hilaire died on June 19, 1844, Lakanal was among the mourners at his funeral. But Lakanal himself was soon to follow his friend into the grave. He died on February 14, 1845. Today we commemorate the hundredth anniversary of the death of these two outstanding Frenchmen: Étienne Geoffroy Saint-Hilaire, the great naturalist, and Joseph Lakanal who protected and furthered French cultural institutions in a time of war and great stress for his country.

APPENDIX

Transcript of Étienne Geoffroy Saint-Hilaire's letter to Lakanal in the possession of Dr. William L. Straus, Jr.

A Monsieur

Monsieur Lakanal

ex-conventionnel, français réfugié depuis 19 ans, en territoire libre de l'Amérique du Nord, à la Mobile pour lui être remise à son passage par l'Havre.

Monsieur, cher et honoré confrère,

Je vous crois en mer: c'est ainsi calculé entre M. Jevelt et moi. Vous avez vendu votre propriété de la Mobile et vous nous revenez, par la porte *d'honneur*.

J'ai eu soin de faire mettre cela dans le Constitutionnel de novembre, j'ai voulu que votre retour fût annoncé comme un avènement heureux et de vertueuse réhabilitation.

Pour moi, je vous prépare un sujet aussi d'une intégration grande et juste dans le sentiment français. Je finis un ouvrage d'histoire naturelle in 4°; le plus haut terme où je pouvois arriver dans les sciences, par une découverte immense à me faire donner ce défi *aut totum aut nihil*! tout ou rien.

Eh bien! je clos cet ouvrage par un morceau, où je montre que 6 hommes éminens ont fait la fortune du jardin du roi: 1° Guy de la Brosse, 1er fondateur, 2. Buffon deux°. fondateur, 3. —— Lakanal (10 juin 1793) Cuvier 2° instaurateur, 4. *Thiers*, donneur de millions et accroissant le jardin, & &. je vous laisse à deviner le surplus.

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[21] The expression "aut totum, aut nihil" also appears in the *Études progressives* (1) p. 166.

Mais ce à quoi je vous prie de donner la plus grande attention, c'est que j'ai une famille nombreuse, mes trois femmes, mon fils et mon gendre et brochant sur le tapis, encore aussi une petite fille, que tous nous vous attendons avec les sentimens d'une reconnoissance bien dodue; c'est encore que j'ai une petite chambrette, [que] dans [22] les jours de gloire et de bonheur pour moi et la France, j'ai sanctifiée par des messes archiépiscopales et la retraite d'un homme dont la tête étoit mise à prix. En sentimens politiques et religieux nous étions aux deux bouts de l'échelle. L'archevêque de Paris a passé une quinzaine dans cette chambrette, vierge d'événemens depuis cette époque. Cette chambre vous attend: elle vous est offerte pour un même délai; avec cette différence que nous tous vous serons sympathiques,[23] et que nous ne ferons qu'acquitter la dette de l'amitié. Soyez de cela bien avertis, monsieur l'ancien grand-vicaire d'évêque. Venez à nous, à nos coeurs sans façon (et pour être traités de même [)].

Adieu, bien cordialement

Geoffroy S. Hilaire

29 novembre.

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[22] At this point the letter is torn to the extent of about ½ inch, so that the reading is not quite certain.

[23] The letter has "symphatiques."

MIGUEL TAFUR—PROTOMEDICO

GEORGIANNA SIMMONS GITTINGER

When Hipólito Unanue gave up his medical career to follow the stars of liberation and fight with San Martín and Bolívar, his work as Protomedico and Professor of Medicine in Lima was carried on by Miguel Tafur.

The two were contemporary, and their early histories were similar; each was left to a widowed mother in infancy, each claimed Gabriel Moreno as inspiration in the beginning of his medical career, but Unanue who was eleven years the elder, pursued medicine from the start, while Tafur turned first to theology. Thus it was that Unanue was already among the instructors when Tafur appeared as a student of medicine.

The name of Hipólito Unanue is revered as one of the great Liberators and as a great professor of medicine. Books have been written about him, but little has been said of the man to whom his mantle fell.

Miguel Tafur was born in Lima, September 29, 1766, the son of a poor family. He was only three years old when his father died, so it was his mother, a capable and devoted woman, who managed his education.

The boy studied Latin from his earliest years, and referred to the classic authors of the Augustan age as his chief guide and inspiration throughout his life. This is reflected in the Latin titles and interpolated phrases in most of his writings. He also expressed due reverence for the great Arabs.

Since poverty prevented his attending one of the more renowned schools, the youth was educated in the College of Santo Tomas, where his main interest was Physics. He passed his examination in Philosophy in 1778, then turned to the study of scholastic Theology. Though inspired by religion, he decided Medicine was a more useful study and finally made this his life interest.

Tafur began the study of Medicine at the age of fifteen, and passed his bachelor's examination and was made an Assistant in 1784, at the age of eighteen. Among his notable instructors along with Moreno and Unanue was Cosme Bueno. They gave him a sound medical foundation with a background of general humanistic culture. Having an innate vocation to instruct youth added to erudition and enthusiasm he applied for a major professorship in 1784 but was defeated. He suffered a

second defeat in 1785, this time for Associate Professor, and again in 1789 when Unanue was the successful candidate. However this never marred their friendship. Tafur continued his work in clinic as physician to the Augustinians, Capuchins and Dominicans from 1790 to 1794. He achieved his Doctor's degree October 20, 1793, and finally realized his ambition as Professor of Therapeutics in 1798.

He always continued his classical studies, but at the same time kept abreast of contemporary medical and scientific progress. In 1807 he was appointed to the Board of Public Health, and in 1808, with Unanue, he founded the College of Medicine of San Fernando.

On the restoration of Carlos IV after the Napoleonic interlude, Unanue went to Spain to represent Peru at the Cortés of Cádiz. There he declined a title of nobility, but asked for a charter for his new medical school of San Fernando.

Unanue, who had never been as poor as Tafur, now inherited from a friend a fortune and land near Lima. Thus in 1814 he was able to leave his medical posts for political leadership in the revolution for freedom from Spain. His duties passed to Tafur, who became Director of the College of Medicine of San Fernando, temporary Protomedico and Associate Professor of Medicine. On October 10, 1815, the King of Spain appointed Tafur, Unanue and Valdes Court Physicians.

The University was the seed bed of the spirit of liberty. The germs of emancipation were latent in all its intellectual classes, of which the Medical faculty was supreme, and Unanue was outstanding in this group. Recognized abroad (which Tafur was not), he was a member of the Academies of Medicine of Madrid, Munich, Edinburgh, Philadelphia and others. Of his one hundred or more writings, at least eighty concerned phases of Peruvian life. Tafur wrote primarily on medical themes.

On July 29, 1821, when National Independence was declared, Tafur as interim Protomedico, took the oath as Protomedico for God and Country. He represented Cuzco in Congress 1822-25, but was undistinguished; rarely is a great doctor an equally great politician. He then turned all his energies to the offices of Protomedico and Director of the College of Medicine, where he waged a never ending fight against charlatans.

Meanwhile, with the Republic securely established, Unanue retired to his estates in 1826 and gave his attention to the education of his daughters. He was then 71 years old.

The office of Protomedico was less important under the Republic, its duties devolving gradually on a Board of Health. Therefore Tafur reached the real peak of his career as Rector of the University of San Marcos 1826-28, and also as major Professor of Medicine there. He

was elected Rector again from 1832-1834 but he died in 1833, aged 67. He left no children. Unanue had preceded him six months before.

The character of Tafur was genial, popular and frank, liberal yet with decorum. He was intensely devoted to his city Lima.

Always an eloquent writer, his literary style is somewhat affected and is filled with metaphors and with allusions to the classical writers. He knew their works and quoted Hippocrates, Galen, Avicenna, Oribasius, Fabricio D'Acquapendente, Hoffmann, Boerhaave, Hulme, Van Swieten, Morton, Bartholin and many others.

Jealous of his medical rank, like other medicos of the time, he disparaged surgeons. A superb clinician, he seemed to have a genius for the precise moment to administer therapies. Though ignorant of the cause of malaria, he agreed that cascarilla is the universal febrifuge. He had no use for polypharmacy, refusing to "torment the patient with useless drugs," and used critical caution in all his prescribing.

A prodigious writer, from 1789 on, his works included physiological themes, works on the digestive tract, purges, and hunger. In discussing bronchotomy, January 29, 1798, he quotes frequently from classic authors, from Hippocrates down to Cicero. Bleeding and purging, the sovereign remedies of the time, were a part of his practice, but in 1798 some of his lectures warn against the excessive use of the lancet.

In the Allegatio, delivered May 19, 1798, at the time he applied again for a full professorship, he recapitulates his philosophy of life and his life story. Filled with modest misgiving of his fitness for the honor, he hopes to keep faith with his Alma Mater. He refers to his youth guided by his mother, early widowed, and by his excellent teachers who gave him the invaluable foundation of Latin and the elements of Physics. The brief study of Theology is referred to, and his reason for transferring to medicine as a "more useful study." He inscribes panegyrics to Dr. Don Juan de Aguirre, Professor of Medicine and Protomedico of the Kingdom at that time, as an inspiration to his work then and thereafter.

He explained his earlier aspirations for professorships which were three times denied, due to his youth and inexperience. He now appears to accept these failures philosophically, and praises the successful candidate in each case. Mentioning his studies in medicine and in modern languages as well as Greek, he protests that he undertook this last, not to appear erudite, but to be able to read Hippocrates and Galen in the original.

The teacher's aim is to make himself useful and profitable to humanity, and he describes himself as filled with a warm spirit of piety and religion. With disinterest, with frankness, and with tenderness he feels respon-

sible for the public health and never discriminates between rich and poor, plebeian and noble. Such a career justifies his being considered as a Professor useful to the public and of benefit to his country.

Referring once more to his earlier unsuccessful candidacies for professorships, a note of resentment seems apparent that zeal and devotion to duty had not met the prompt rewards bestowed on other no more earnest applicants, and he suggests that youth was an unwarranted handicap. In his peroration he asserts his total lack of the "shadow of pride and vanity" and asseverates his devotion to duty and truth.

In September of that same year, 1798, Tafur delivered an inspiring oration to the glory of O'Higgins, and in August 1801 he again participated in politics with a devout panegyric on the Marquis, Don Gabriel de Aviles, the Viceroy, the avowed idol of the Peruvians of his time. His intense patriotism extended itself to all who sincerely served his country.

In his later therapeutic discourse we find (Dec. 24, 1802) reference to glandular function and discrimination. On Sept. 30, 1803, he lectured on natural cures and stated that seldom does nature cure unaided, and if medication has not been given, then a strict diet is responsible for the recovery. On May 11, 1804 he discussed the limits of medical treatment: "medicine has limits, at times very narrow . . . do not torment the patient with useless medicine and hasten his death thereby." Referring to the hopelessness of hereditary epilepsy "even though the doctor works to cure hereditary diseases, even though he uses fearsome remedies it is impossible to change nature and to cut at the root of ills which were born with the man."

About July 4, 1804 the professor produced an essay on chocolate in which he concurred with Caldera that it is the most delicious of all drinks, agreeing that Linné had justly termed it Theobroma, drink of the gods. Its large content of oil should make it an unsuitable food for the tropics. Though he admits its indigestibility in large amounts and quotes theses in support of its harm to the digestive system, nevertheless he feels the world will agree with his poetic enthusiasm in naming it "divine nectar, potion of heaven, food of the gods, Panacea, and Universal Medicine."

November 8, 1806, speaking on smallpox vaccine which Carlos IV had sent to Lima, he extolled the King's benevolence and emphasized the preventive and therapeutic value of the vaccine.

June 8, 1807 he delivered an address to the Viceroy, Don José Fernando de Abascal y Sousa in which he lauded the measures of hygiene and sanitation for the city.

In answer to a suggestion that Baglivi had once made that Astronomy

be included in the medical curriculum, Tafur made an emphatic response opposing this and reasserting the superiority of medicine over surgery.

The still undecided theory of the origin of lues caught his attention and April 7, 1808 he stated his beliefs on that controversy. Recapitulating old ideas such as the malign stars, the failure to continue the baths of ancient Rome, the eating of human flesh which was resorted to when Charles VIII conquered Italy, and even that the ill might be air borne, he concurs in the modern knowledge that it is a disease of sensuality. Tafur inclined to the theory of its American origin, since only after the return of Columbus in 1494 was any description given. And since there is no mention of such a disease in any of the writings of the ancients (he says), it must be a modern transplant to Europe. More important than its origin is the discovery of its cure; and January 22, 1811, he discussed the use of mercury, particularly the bichloride as an effective remedy, though too poisonous for internal use. Tafur thinks mercury might be applied by inunction.

Such are the salient themes of his lectures and orations, which he continued to deliver throughout his career.

With Horace he could say, "I shall not die irrevocably if my works survive my time." His epitaph is still pertinent:

HERE LIES

DR. MIGUEL TAFUR

RECTOR OF THE UNIVERSITY OF SAN MARCOS
AND PROTOMEDICO OF PERU,
HE OWED HIS POSITION
TO HIS TALENTS AND GENIUS,
AND THE GENERAL ESTEEM
TO HIS VIRTUES.
RELIGIOUS, FRANK, POPULAR
HE WAS LOVED BY ALL IN LIFE
AND LAMENTED AT DEATH.
HE EXPIRED DECEMBER 7, 1833
BUT HIS NAME LIVES
FOREVER TO GIVE RESPECT
TO PROBITY, TO THE SCIENCES AND TO TALENT.

REFERENCES

Vida y Obras del Dr. Miguel Tafur.—Juan B. Lastres, August 13, 1942, Anales de la Sociedad Peruana de Historia de la Medicina, Lima, 1943.

Unanue.—Carlos Enrique Paz Soldán, Address in Instituto San Martín, Buenos Aires, Nov. 23, 1934.

Aesculapius in Latin America.—Aristides A. Moll, Saunders, 1944.

MEDICO-HISTORICAL NEWS AND ACTIVITIES

THE AMERICAN ASSOCIATION OF THE HISTORY OF MEDICINE

The Association has recently lost several of its distinguished members. Dr. Logan Clendening, Professor of Clinical Medicine and Director of the Library and Museum of the History of Medicine at the University of Kansas, Vice-President of the Association from 1942-1943 died on January 31, 1945. Rear-Admiral Charles S. Butler, U. S. Navy, retired, died October 7, 1944.

CONSTITUENT SOCIETIES

The Beaumont Medical Club, New Haven, Conn.

The seventieth meeting of The Beaumont Medical Club was held in the Beaumont Room, Yale Medical Library on March 2, 1945. The program was as follows:

Recent Accessions Relating to Peter Parker, M. D.
Dr. SAMUEL C. HARVEY

A Medical History of James Boswell, Esq. Mr. JAMES M. OSBORN

The New York Society for Medical History

A joint meeting of The Section on Historical and Cultural Medicine of the New York Academy of Medicine and The New York Society for Medical History was held on March 14, 1945 at the Academy of Medicine to celebrate the Bicentennial of the birth of Philippe Pinel (1745-1826). The following program was presented:

Biographical Remarks.	Dr. VICTOR ROBINSON
Pinel in Medicine.	Dr. CLAUDE HEATON
Pinel in Psychiatry	Dr. RAYMOND DE SAUSSURE

NATIONAL NEWS

Ecole Libre des Hautes Etudes. Centre d'Etudes Médico-Sociales.

In commemoration of the bicentenary of the birth of Philippe Pinel (1745-1826), the Ecole Libre des Hautes Etudes, Centre d'Etudes Médico-Sociales will hold a dinner on April 18, 1945 at the Hotel Savoy-Plaza in New York under the chairmanship of Mr. Guerin de Beaumont, Consul General of France in New York. The following program will be presented:

Professor Leon Brillouin: Welcome to the guests.
Dr. Raymond de Saussure: Pinel, Founder of Modern Psychiatry.
Dr. Camille Dreyfus: La Médecine de Pinel.
Professor Arturo Castiglioni: Chiarugi and Pinel.
Dr. Gregory Zilboorg: L'Influence de Pinel en Grande Bretagne et en Amérique.

The Medical Society of the District of Columbia

The history of the Medical Society of the District of Columbia from its founding to the present day has just been completed by Dr. John B. Nichols, who is chairman of the committee on history. The other committee members include Dr. William J. Mallory and Dr. Joseph S. Wall.

New York Academy of Medicine

In honor of the four hundredth anniversary of the publication of Conrad Gesner's bibliography, *Bibliotheca universalis*, the New York Academy of Medicine library arranged an exhibition of books on medical bibliography to the end of the 18th century.

NEWS FROM EUROPE

France

Relations have been reestablished with our French colleagues. At the meeting of January 6, 1945 the Société Française d'Histoire de la Médecine elected the following new officers:

President: Dr. Neveu
Vice-Presidents: Prof. Tanon
Dr. Vinchon
General Secretary: Prof. E. Olivier
Secretaries: Dr. Molinery
Dr. Finot
Librarian: Dr. A. Hahn
Treasurer: H. Génot
Council Members: Prof. Lévy-Valensi
Dr. Lemay
Médecin Général Inspecteur Rouvillois
Dr. Gallois
Prof. Villaret
Dr. R. Bénard
Médecin Général des Cilleuls
Prof. Lian
Prof. Lavier

U. S. S. R.

Professor I. D. Strashun, formerly Director of the First Leningrad Medical Institute, has been elected a member of the new Academy of Medical Sciences of the U. S. S. R. in Moscow and is now Vice-Director of the Institute of Public Health and the History of Medicine of the Academy.

BOOK REVIEWS

MADGE E. PICKARD and R. CARLYLE BULEY. *The Midwest Pioneer. His Ills, Cures, and Doctors.* Crawfordsville, Indiana: R. E. Banta, 1945. 339 pp., illustrated. $5.00.

This first general history of pioneer medicine covers mainly the first half of the 19th century and the States of Indiana, Ohio, Illinois, Michigan, Kentucky, with occasional data from Missouri, Iowa, and Wisconsin. We learn that the newcomers suffered from an almost incredible number of diseases, among them malaria, smallpox, cholera, typhoid, milksickness, diphtheria, lockjaw, etc. The numerous home remedies of the settler were often a curious blend of European and Indian folklore, and his belief in magic was strong. The "regular" doctors relied on two dangerous panaceas: bleeding and calomel. Scientific medicine was only in the making, and a majority of the frontier doctors had not had an opportunity to acquaint themselves even with the existing fragments of scientific medicine. The two main assets of the "regulars" were their surgical skill and the fight of a highminded minority among them for better education and organization. Under the given circumstances it is no wonder that all kind of sectarians from the Eclectics and Homoeopaths down to the Thomsonians, Hydropaths, Phrenologists, and quacks of every description successfully competed with the regulars. Patent medicine advertisements were the main financial basis of the pioneer press, and patent medicine producers made millions among the frontier people. This picture of pioneer medicine does not correspond to the pattern dear to what has aptly been called the romantic school of medical historiography, but I think that nobody who has studied the source material can deny its fundamental correctness.

This book, intended as a contribution to social history, is excellent medical history too. A medical man myself, I feel somewhat sorry that I have to state that it is much better medical history than what is so often written by physicians, who tell us a great deal about the personal life of doctors, of their schools and associations, but rarely anything about diseases, their diagnosis and treatment, which after all should still be the main concern of medical history. In this book the whole medical reality is given in its proper proportions.

The humorous vein in which the book is written makes it excellent reading, and without the psychological safety-valve of wit it might perhaps be sometimes impossible, in this as in other cases, to go on wading through the horrors of history. But it seems to me, nevertheless, that the authors have somewhat exaggerated in this direction, and thus dismissed prematurely as mere jokes too many problems which would deserve deeper examination, as e. g. the borrowings from Indian medicine, the rationale of home remedies, the character of some of the sectarian movements and of some personalities like C. S. Rafinesque, though in the two latter cases the authors have certainly tried their best to be fair. Particularly in medical history, antiquated modes of expression make things sometimes appear comical which, as far as their contents are concerned, actually are not silly at all.

And I think, for instance, that the claims of the sectarians that during the cholera epidemics they lost fewer patients than the regulars are unfortunately not so ridiculous. It is hard to see how with all their cranks and ignorance they should not have fared better, particularly on this occasion, than those who routinely took one to two pints of blood from their patients.

The hostility of certain sections of the population towards the regular doctors during the period under discussion might surprise those who were brought up with certain medico-historical myths, though the phenomenon has already been pointed out by Shryock and recently by B. Stern. This is a very complex question, and the authors have provided some very excellent answers, in drawing attention to the fact that the doctor not only reaped the bitter fruits of his bleeding and purging practices, but that he suffered also from the hatred of the "Jacksonian democracy" against the educated, and from certain religious prejudices which even today create opposition against dissection and animal experimentation, a problem unknown in other countries of Western civilization.

The fact that the authors have used predominantly non-technical sources is sometimes felt in the arrangement of the first chapter (on diseases), and in such very secondary details as in the crediting of the antifever-pill Doctor Sappington with the introduction of quinine in the Middle West, credit he does not deserve.

My few critical remarks should not obscure the fact that this is not only the only existing general medical history of the pioneer Midwest, but a book the quality of which will be difficult to surpass. The volume is beautifully printed and bound, and has an excellent annex, discussing the bibliographic sources for the field.

ERWIN H. ACKERKNECHT

One Hundred Years of American Psychiatry. Published for the American Psychiatric Association. New York: Columbia University Press, 1944. xxiv + 649 pp., 35 ill. $6.00.

Anniversaries are valuable occasions because they provide an excuse and an opportunity for institutions and organizations to take inventory of their present situation in the light of their past achievements or failures. When a survey such as the present volume is made, which honestly attempts to assess and evaluate the past and not merely extolls its heroes, history is made to serve a useful purpose. It enables us to orientate ourselves in present day life with the aid of knowledge of the past.

The year 1944 marked the 100th anniversary of the American Psychiatric Association, which grew out of the Association of Medical Superintendents of American Institutions for the Insane, established in Philadelphia in October 1844 when thirteen superintendents of insane asylums resolved to form a national organization. This was the earliest national organization of physicians in this country, antedating the American Medical Association by three years.

As part of the anniversary celebration the present volume was prepared for the Association under the able editorship of Dr. J. K. Hall, General Editor, Dr.

Gregory Zilboorg, Associate Editor, and Dr. Henry Alden Bunker, Assistant Editor. The following fifteen essays by leading psychiatrists, historians, a sociologist, and an anthropologist treat the history of American psychiatry from many angles:

Richard H. Shryock: "The Beginnings: From Colonial Days to the Foundation of the American Psychiatric Association."
Henry E. Sigerist: "Psychiatry in Europe at the Middle of the Nineteenth Century."
Winfred Overholser: "The Founding and the Founders of the Association."
Samuel W. Hamilton: "The History of American Mental Hospitals."
John C. Whitehorn: "A Century of Psychiatric Research in America."
Henry Alden Bunker: "American Psychiatric Literature during the Past One Hundred Years."
William Malamud: "The History of Psychiatric Therapies."
Albert Deutsch: "The History of Mental Hygiene."
Albert Deutsch: "I. Military Psychiatry: The Civil War, 1861-1865."
Edward A. Strecker: "II. Military Psychiatry: World War I, 1917-1918."
Albert Deutsch: "III. Military Psychiatry: World War II, 1941-1943."
Thomas Verner Moore: "A Century of Psychology in Its Relationship to American Psychiatry."
Henry Alden Bunker: "American Psychiatry as a Specialty."
Gregory Zilboorg: "Legal Aspects of Psychiatry."
Clyde Kluckhohn: "The Influence of Psychiatry on Anthropology in America during the Past One Hundred Years."

Each essay gives a well-documented account of its particular subject, and the editors have skillfully added cross references to other essays in the volume which touch on the same problem.

One hundred years ago the treatment and care of the mentally ill in this country had just emerged from a period when the insane were segregated from society in jails, prisons, and lunatic asylums where they were treated worse than animals, beaten, and kept in chains. There was little or no understanding of the maladies from which they suffered. Gradually, through the efforts and example of Pinel in France, the Tukes in England, and Benjamin Rush and Dorothea Lynde Dix in this country, steps had been taken to provide at least a decent maintenance of such unfortunates, with the result that suitable institutions were established for their care. The physicians in charge of such institutions were often mere administrators who were interested primarily in problems of hospital construction and the like. The limited medical knowledge of their day did not provide much effective treatment. The trend towards non-medical administrative problems continued as late as 1895 when at the celebration of the 50th anniversary of the Association, Weir Mitchell criticized the Association members for their unprogressiveness and lack of attention to scientific problems. But in spite of the lack of scientific contributions in this period, American psychiatry progressed in other fields such as the medical jurisprudence of insanity, as exemplified by the work of Isaac Ray.

As in most branches of medical science, psychiatry in America was dependent

upon basic discoveries made in Europe for its brilliant development in the past 50 years. Studies made by Charcot, Janet, Kraepelin, Freud, Bleuler, Jung and others laid the basis for our modern psychiatric knowledge which was formulated and given its initial impulse in this country largely through the efforts of Dr. Adolf Meyer, who was himself European-trained. Resent developments such as the mental hygiene movement, psychiatric social work and child psychiatry are direct products of the enlarged viewpoint which has been introduced: that the individual is not an isolated unit, but an organism functioning in a certain physical and social environment. Improved methods of treatment have removed the psychiatrist from the role of custodian of the insane to that of the healer and educator.

This volume is a valuable contribution to our knowledge of the history of psychiatry in this country. While we already possessed works such as Hurd's 4-volume *The Institutional Care of the Insane in the United States and Canada*, Baltimore, 1916-1917, and Albert Deutsch's *The Mentally Ill in America*, New York, 1937, which discuss institutions and the care of patients, *One Hundred Years of American Psychiatry* gives us the first comprehensive account of psychiatry itself, its theories and practices, and its relationship to allied sciences such as psychology and anthropology.

GENEVIEVE MILLER

RALPH LINTON, ed. *The Science of Man in the World Crisis.* New York: Columbia University Press, 1945. 532 pp. $4.00.

The goal of this collection of essays, written by some of the most representative contemporary anthropologists, is to summarize the contribution of anthropology to the problems of our time. The present review examines the volume from a more limited point of view: its helpfulness to the medical historian. Some of the results of anthropology are highly significant to him. The publication of such a symposium offers a most welcome occasion to the outsider who cannot systematically follow anthropological literature to familiarize himself with its last results. (From this point of view it is regrettable that not all of the contributors have provided their papers with the usual apparatus of references.)

Three articles on physical anthropology fulfill most successfully this purpose of rapid and solid reorientation. H. L. Shapiro deals mainly with biological plasticity of man, race crossing, and racial physiology. W. M. Krogman with the concept of race, and O. Klineberg with racial psychology. Karl Sax's interesting essay on population problems suffers from being a purely quantitative approach. Yet our main problem in this field is not the absolute numbers we will have in 1960, but the age composition and other qualitative aspects of our population.

Among those contributions which discuss what is commonly called cultural anthropology R. Linton's "Present World Conditions in Cultural Perspective" stands out as an impressive generalization and application of anthropological results. M. J. Herskovits' "Processes of Cultural Change" and A. I. Hallowell's "Sociopsychological Aspects of Acculturation" summarize very ably certain aspects of recent anthropological thought and endeavor, which are destined to throw new light on many historical problems. Other articles of this group unfortu-

nately suffer from a rather sterile preoccupation with terminology and abstractions which contemporary anthropologists sometimes seem to have acquired in their recent contacts with psychology and sociology.

Articles like those of H. A. Meyerhoff on the present state of world resources, of P. F. Lazarsfeld and G. Kupfer on communications research, a whole section of excellent studies on colonial and minority group problems do not directly concern the medical historian, but will interest him tremendously as a citizen.

ERWIN H. ACKERKNECHT

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